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New Taxa and Nomenclatural Combinations of
Mesoamerican Grasses (Poaceae)

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ABSTRACT. As a result of a review of the grass family for *Flora Mesoamericana*, 13 new species (*Arthrostylidium judziewiczii*, *A. merostachyoides*, *Aulonemia clarkiae*, *Merostachys latifolia*, *Rhipidocladum martinezii*, *Guadua macclurei*, *Arberella grayumii*, *Cryptochloa soderstromii*, *Pariana argentea*, *Danthonia chiapasensis*, *Perilema diandrum*, *Digitaria breedlovei*, *D. clavitricha*) and three new varieties (*Eragrostis rufescens* var. *mesoamericana*, *Panicum aquaticum* var. *cartagoense*, *Andropogon gerardii* var. *hondurensis*) are described, one new name (*Elymus cordilleanus*) is proposed, 17 new combinations (*Guadua longifolia*, *Chondrosium hirsutum* var. *glandulosum*, *Dichantherium sphaerocarpon* var. *floridanum*, *D. sciurotoides*, *D. sciurotis*, *D. aciculare* var. *ramosum*, *D. dichotomum* var. *unciphyllum*, *D. umbonulatum*, *D. cordovense*, *D. pantrichum*, *Paspalidium chapmanii*, *P. distantiflora*, *P. leonis*, *P. pradana*, *P. ophiticola*, *P. subtransiens*, *P. utowanaea*) are made, and one name (*Bromus exaltatus*) is lectotypified.

As a result of writing the account of the grass family for volume 6 of *Flora Mesoamericana*, a number of new taxa were recognized, and the need for several new combinations became apparent. These are published here under the authorship of the person(s) primarily responsible for the account of the taxon. The taxa are arranged in the taxonomic se-

quence used in *Flora Mesoamericana*, which for a large part follows the scheme of Clayton & Renvoize (1986).

In the bamboo descriptions we refer to the two main types of leaves found in bamboos as the culm leaves and branch leaves. The latter leaf type has been more commonly known in recent years as foliage leaves. However, besides the redundancy implicit in the term foliage leaves, the term branch leaves, in parallel to culm leaves, is more precise in describing the location of these leaves.

BAMBUSEAE: ARTHROSTYLIDIINAE

***Arthrostylidium judziewiczii* Davidse, sp. nov.**

TYPE: Costa Rica. Heredia: primary forest along Río San Rafael, Atlantic slope of Volcán Barva, 10°13'N, 84°05'W, 1,500 m, slender-stemmed, scandent and apparently epiphytic bamboo on mossy trunk of large tree, 3–4 m above ground, 12 Apr. 1986, *M. H. Grayum* 7024 (holotype, MO; isotypes, BM, CANB, CR, F, ISC, K, PMA, SI, SP, US).

Bambusa lignosa caespitosa. Culmi cavi ad 4 m longi, 1–2 mm diametro, scandentes; nodis in medio culmi ramos singulares gerentibus. Folia culmorum caduca. Folia ramorum laminis 6–13 cm longis, 1–2 cm latis, glabris. Inflorescentiae bilaterales, spicatae terminales et axillares, terminales 8–14 cm longae; rhachidi recta ca. 1 mm lata, 4–6 spiculas gerenti. Spiculae singulares, 3.5–6.5 cm longae, sessiles; gluma inferna absenti; gluma superna

5.5–6.5 mm longa; flosculo infimo sterili; flosculis fertilibus 5–6, lemmate 8.0–11.5 mm longo, 9-nervi; callo piloso trichomatibus 1.0–1.5 mm longis brunneis, lodiculis 3 ciliolatis, ovario apice puberulento, stylus 1, stigmatibus 2. Fructus non suppetens.

Delicate, caespitose, scandent bamboo to 4 m long. Culms 1–2 mm diam., hollow, cylindrical, smooth, glabrous, the wall ca. $\frac{1}{3}$ as thick as the culm diameter; nodal line evident but not expanded, glabrous. Culm leaves (only 2 available from secondary branches) soon stramineous, deciduous; sheaths puberulent at the base and the lower margins; oral setae similar to those of the branch leaves; blades 2.0–2.5 cm long, 3–4 mm wide, lanceolate, reflexed, earlier deciduous than the sheath, narrowed at the base to a pseudopetiole 0.2–0.5 mm long, glabrous, marginally scaberulous in the upper half. Branching intravaginal at the lowermost and uppermost nodes; buds solitary; primary branches at midculm nodes solitary, typically not rebranching at the lower nodes and midculm internodes, sparingly rebranched along their length, rarely with up to 3 branches at the uppermost nodes. Branch leaves 1–6 per complement; sheaths slightly keeled, mostly glabrous, puberulent near the base region and along the overlapping margin; pseudopetiole 1.6–3.0 mm, flattened, glabrous; external ligule a minute rim; internal ligule 0.3–1.5 mm long, a glabrous membrane; oral setae 4.0–9.5 mm long, membranous, whitish; blades 6–13 cm long, 1–2 cm wide, lanceolate, glabrous, basally obtuse, apically acuminate, marginally scaberulous, the midnerve not evident, the lower surface with evident tessellate venation. Inflorescences bilateral, spicate, terminal and axillary from the main leaf complement and sometimes from bladeless secondary branches; terminal spikes 8–14 cm long, with 4–6 spikelets; peduncle glabrous, mostly not exerted from the subtending sheaths; rachis ca. 1 mm wide, straight, glabrous, strongly nerved, sulcate on the side bearing spikelets; axillary spikes similar to the terminal ones but shorter and with fewer spikelets; uppermost 1 or 2 lateral spikelets subtended by solitary or paired glumelike, obtuse, ciliolate bracts to 1 mm long; lowest spikelet sometimes subtended by bracts to 9 mm. Spikelets 3.5–6.5 cm long, sessile, solitary, linear, with 7–9 florets; lower glume absent; upper glume 5.5–6.5 mm, asymmetric, 6-nerved, the midnerve prominently keeled on the back, excurrent as an awn tip 0.2–1.8 mm long, glabrous or ciliolate within the same inflorescence, the outer nerve on the wider portion sometimes slightly keeled, the two keels meeting the edge of the rachis groove; rachilla segments 4–7 mm long, flattened, prominently hispidulous in the upper $\frac{1}{4}$ – $\frac{3}{4}$ with brownish hairs on

the side opposite the subtending lemma; lowest floret sterile, the lemma 9-nerved, abaxially tessellate-nerved, the midnerve prominent, excurrent as an awn tip 0.5–1.3 mm long, a palea absent or to $\frac{1}{2}$ as long as and much narrower than the lemma, the callus glabrous; fertile, bisexual florets 5–6, the lemma 8.0–11.5 mm, 9-nerved with the midnerve excurrent as an awn point 0.5–2.0 mm long, glabrous, marginally scaberulous in the upper $\frac{1}{3}$, the callus prominently appressed pilose with hairs 1.0–1.5 mm long, the hairs initially white, turning brown, the palea nearly as long as the lemma, membranous, 2-nerved, 2-keeled, the keels ciliolate; uppermost 1–2 florets smaller, without flowers; lodicules 3, membranous, lanceolate, ca. 3–3.5 mm long, forming a tube around the pistil, ciliolate at apex, sparsely nerved; ovary with a puberulent apex; stamens 3, the anthers 3.8–5.1 mm long, yellow; style 1; stigmas 2, long-plumose. Fruit not available.

Paratype. PANAMA. BOCAS DEL TORO: along trail back to Boquete, in cloud forest, scandent, no larger culms seen, 6,000 ft., 13 Feb. 1979, *Hammel 6173* (MO).

Although the type collection was apparently epiphytic (M. H. Grayum, pers. comm.), this was probably an isolated instance as happens sporadically and accidentally with other grasses when their seeds happen to land on tree trunks and in branch crotches with a large accumulation of epiphytic plant debris.

Just as at the lowermost and uppermost nodes, the branching at midculm nodes is probably also intravaginal, despite the fact that the mostly solitary branches are predominantly divergent at the base as in many other scandent bamboos. This habit with widely spreading branches is doubtlessly important in enabling these plants to climb into supporting vegetation. Young culms with culm leaves are not among the available collections, but it appears that the culm leaves are quickly pushed away by the expanding branch.

Arthrostylidium judziewiczii has three unusual characters, one of which makes placement within *Arthrostylidium* Rupr. somewhat problematical.

First, the prominently pilose callus is unusual. The only other species with hair on the callus is *A. ecuadorensis* Judz. & L. G. Clark, but in this species it is much less prominent.

Second, unusual in the genus is the production of one branch per node that is not rebranched at its basal nodes. However, at one midculm internode of *Grayum 7024* (MO), the primary branch was immediately branched at the base. Furthermore, at occasional nodes near the apex of the culm, the primary branch may also be branched immediately, thereby producing a complement of up to four lateral

branches. The occurrence of occasional basal branching is judged to be an indication of fundamental similarity to the typical branching pattern in the genus. Among New World bamboos, basally unbranched primary branches are characteristic of *Olmeca* Soderstrom, *Myriocladus* Swallen, and most species of *Aulonemia* Goudot. All these genera have panicles in contrast to the unbranched spikes or racemes in *Arthrostylidium* (except *A. merostachyoides* with a highly reduced panicle, see below). *Myriocladus* is a totally distinct endemic genus from the Guayana Highlands. *Olmeca* has fleshy fruits, erect culm blades, and sympodial rhizomes. *Aulonemia* species usually have articulated, reflexed blades, and in this regard *A. judziewiczii* appears to be similar. However, only culm leaves from secondary branches with moderately developed blades were available for study, and it is not certain that these have the same morphology as typical culm leaves from lower to midculm nodes from the main culm. The evidence therefore remains inconclusive. The spike of *A. judziewiczii* is quite similar to that of most species of *Arthrostylidium*, although most species differ in having subsessile spikelets with a small but evident pedicel, thus making the inflorescence a spikelike raceme.

Third, also unusual is the occasional production of small glumelike bracts at the base of the spikelets, which, although very small, clearly embrace both the spikelet base and part of the rachis. These are therefore homologous to subtending leaves, and the inflorescences are bracteate spikes. Furthermore, this is one of the transitional stages postulated for the origin of normal grass spikelets from pseudospikelets as hypothesized by McClure (1934, 1966). Additional comments on this topic will be presented in a separate paper.

The specific epithet honors the outstanding contributions to agrostology of Emmet J. Judziewicz, especially his contributions to our knowledge of bamboos.

***Arthrostylidium merostachyoides* R. Pohl, sp. nov.** TYPE: Costa Rica. Puntarenas: Monteverde, 4 Jan. 1985, *R. W. Pohl & L. G. Clark 14613* (holotype, ISC; isotypes, CR, F, K, MO, US). Figure 1.

Merostachys glabra R. Pohl, nom. nud.

Bambusa lignosa caespitosa. Culmi cavi ad 10 m longi et ad 1.5 cm diametro; nodis in medio culmi ramos 7–40 gerentibus. Folia culmorum glabra; vaginis persistentibus; laminis erectis, deciduis vel persistentibus. Folia ramorum laminis 4–17 cm longis, 1.0–2.6 cm latis, adaxialiter glabris, abaxialiter pubescentibus secus marginem

unicum. Inflorescentia unilateralis spicata, terminalis, 2.5–8.0 cm longa; rhachidi recta, 1.5–2.0 mm lata, spiculas numerosas gerenti. Spiculae plerumque geminatae, 9.5–14.0 mm longae, subsessiles, glabrae, supra lemma sterile discedentes; gluma inferna 0.1–2.5 mm longa; gluma superna 2.0–3.5 mm longa; flosculo infimo sterili, 3.5–5.0 mm longo; flosculis fertilibus 2–3, lemmate 6.2–8.2 mm longo, 5–7-nervi, lodiculis 3, glabris, antheris 3, 3.2–4.2 mm longis; ovario glabro, stylo 1, stigmatibus 2. Fructus non suppetens.

Caespitose, ligneous bamboo. Rhizomes pachymorph. Culms 5–10 m long, 1.0–1.5 cm diam., arching, hollow, cylindrical, glabrous, yellow. Culm leaves with the sheaths and blades glabrous; sheaths persistent; blades soon deciduous or persistent in older, larger culms, erect, tapering from the base to the acuminate apex, longer than the sheaths, lacking auricles; external ligule not evident; internal ligule ca. 0.5 mm long, a stiff, minutely ciliate membrane. Midculm branch complement arising from a distinct promontory, this \pm truncate at the apex; branches 7–40 per node, to 30 cm long, some rebranched. Branch leaves 4–7 per complement, the lower blades deciduous; sheaths truncate, puberulent on the overlapping margin, bearing stiff auricular bristles 7–16 mm long; pseudopetioles 1.5–2.5 mm long, flattened, puberulent abaxially; internal ligule 0.5–0.6 mm, a ciliate membrane; blades 4–17 cm long, 1.0–2.6 cm wide, lanceolate-ovate, pendent, flat, rounded to an asymmetric base, acuminate, glabrous above, pubescent along one margin below. Inflorescences 2.5–8.0 cm long, unilateral, reduced racemelike panicles, terminal on leafy or sometimes bladeless branches; rachis 1.5–2 mm wide, obtusely angular, narrowly grooved above the point of spikelet insertion, glabrous. Spikelets 9.5–14 mm long, usually paired, pectinate in 4 rows along one side of the rachis, sometimes solitary in 2 rows, especially toward the tip of the raceme, laterally compressed, with 4 or 5 florets, subsessile, the pedicels 0.4–1.4 mm long; lower glume 0.1–2.5 mm long, 1–3-nerved; upper glume 2.0–3.5 mm long, 3–5-nerved; lowest floret sterile, the lemma 3.5–5.0 mm long, 3–7-nerved; disarticulation above the sterile floret and between the fertile florets; fertile, bisexual florets 2–3, the lemmas 6.2–8.2 mm long, keeled, 5–7-nerved, acute, awnless, the palea subequal to the lemma; terminal sterile floret as long as the fertile florets; lodicules 3, ovate, flat, vasculated, eciliate; stamens 3, the anthers 3.2–4.2 mm long; ovary glabrous; style 1, slightly thickened at the base; stigmas 2. Fruit not available.

Paratypes. COSTA RICA. ALAJUELA: 17–20 km NNW of San Ramón, 10°13'N, 84°32'W, 24 Apr. 1983, *Liesner & Judziewicz 14771* (MO). GUANACASTE: Parque Rincón de la Vieja, 10°46'N, 85°49'W, 2 Dec. 1987,

Herrera 1488 (MO). LIMÓN: Cantón de Limón, cabeceras de Río Cariei, 09°47'20"N, 83°08'18"W, 26 Apr. 1989, *Herrera & Chacón 2801* (MO). PUNTARENAS: Monteverde Forest Reserve, Cordillera de Tilarán, Dec. 1977, *Dryer 1708* (ISC, MO), 12 Apr. 1983, *Judziwicz 4628* (MO, WIS), 24 Aug. 1985, *Haber 2414* (MO), 2415 (MO), 2416 (CR, EAP, ISC, L, MEXU, MO, PMA, SI, US), 27 Aug. 1985, *Haber & Bello 2481* (MO), 12 Feb. 1985, *Grayum et al. 5126* (CR, INPA, ISC, K, MO, US), 4 Jan. 1985, *Pohl & Clark 14611* (ISC, MO).

Arthrostylidium merostachyoides is presently known from cloud forests at elevations from 750 to 1,850 m in the Cordillera de Tilarán, Cordillera de Guanacaste, and one locality of the Atlantic slope of the Cordillera de Talamanca. This distribution suggests that it may also eventually be found in Panama.

Seedlings were abundant on road embankments and cliffs at the type locality in the Monteverde Nature Reserve. Some had reached 1 m height and had short rhizomes. They evidently grew from seeds produced in previous seasons.

Although this species clearly belongs to the Arthrostylidiinae Soderstrom & Ellis (1987), its generic disposition is less certain, a point also discussed by Clark & Londoño (1991). The inflorescence structure is unique in *Arthrostylidium* and initially caused us to consider this a species of *Merostachys* Sprengel. The epithet refers to this similarity. However, *A. merostachyoides* possesses none of the other diagnostic characters traditionally (McClure, 1973) ascribed to *Merostachys*. Specifically, its culm blades are broad at the base and appressed to the culm (vs. narrow, shortly pseudopetiolate and reflexed); the midculm branching complement arises from a truncate promontory (not a triangular plate); the spikelets have a developed lower glume (vs. absent or reduced to a rim); and the palea keels are widely spaced and do not tightly enclose a long rachilla internode with a spikelet rudiment.

The strongly secund inflorescence resembles that of some *Merostachys* species in which the spikelets are paired on each side of the rachis. However, the grooves in the rachis above each point of spikelet insertion are much narrower in *A. merostachyoides* than in *Merostachys* species, and the raceme, therefore, appears less flattened on the spikelet-bearing side. In contrast, all previously described *Arthrostylidium* species have bilateral spikes or racemes, some of which are strongly zigzagged. Nevertheless, the preponderance of diagnostic characters favors a disposition outside of *Merostachys*.

Arthrostylidium and *Rhipidocladum* McClure are very closely related but are distinguished primarily by their midculm branch complements, which arise from a triangular plate in *Rhipidocladum*.

The inflorescence type of *A. merostachyoides* is very similar to that of *Rhipidocladum geminatum* (McClure) McClure, but the species seems otherwise not closely related. *Rhipidocladum* as currently circumscribed has three other inflorescence types, including a zigzag raceme more common among *Arthrostylidium* species (McClure, 1973; Clark & Londoño, 1991).

It should also be noted that only the collections from the Monteverde area show predominantly paired spikelets on each side of the rachis, although toward the tip there is often only one spikelet per node. However, even in these collections, some of the smaller inflorescences borne on leafless branches may only have one spikelet per node on each side of the rachis. Such inflorescences with solitary spikelets at the rachis nodes are nearly identical to those of *Rhipidocladum maxonii* (A. Hitchc.) McClure in organization, but are much larger.

In contrast, in *Herrera & Chacón 2801* and *Herrera 1488* all inflorescences bear one spikelet per node on each side of the rachis. In occasional inflorescences the lowest node of the inflorescence bears an elongated branch with up to eight spikelets. Since the pedicels of "typical" spikelet pairs in plants from the Monteverde region are of slightly different length, we interpret these to represent very reduced branches and the inflorescence, therefore, to represent a reduced secund panicle. Control of inflorescence development is evidently not stabilized in this species.

We agree with Clark & Londoño (1991) that it is likely that some characters traditionally employed to define genera in the Arthrostylidiinae, especially inflorescence type, may have evolved independently several times in this subtribe and that generic delimitations must be reconsidered.

***Aulonemia clarkiae* Davidse & R. Pohl, sp. nov.**

TYPE: Mexico. Chiapas: Municipio Jitotol, 5 km SE of Jitotol along road to Bochil, in trees, open forest with *Pinus*, *Quercus*, *Nyssa*, *Liquidambar*, and *Brunellia*, culms to 8 m tall, 1,600 m, 8 Nov. 1981, *D. E. Breedlove & G. Davidse 55085* (holotype, MO; isotypes, CAS, US). Figure 2.

Bambusa lignosa rhizomatibus 10–30 cm longis et 6–15 mm crassis. Culmi 5–8 m longi, 1.0–1.6 cm diametro; nodis in medio culmi ramos singulares gerentibus. Folia culmorum vaginis persistentibus; setis oralibus abundantibus et prominentibus; laminis reflexis, cauducis. Folia ramorum laminis 10–36 cm longis, 9–15 mm latis, adaxialiter scabris, abaxialiter puberulis. Inflorescentia paniculata, terminalis, 10–33 cm longa. Spiculae 19–25 mm longae; gluma inferna 3–5 mm longa arista 2.0–5.5 mm longa munita; gluma superna 5.0–7.2 mm longa arista

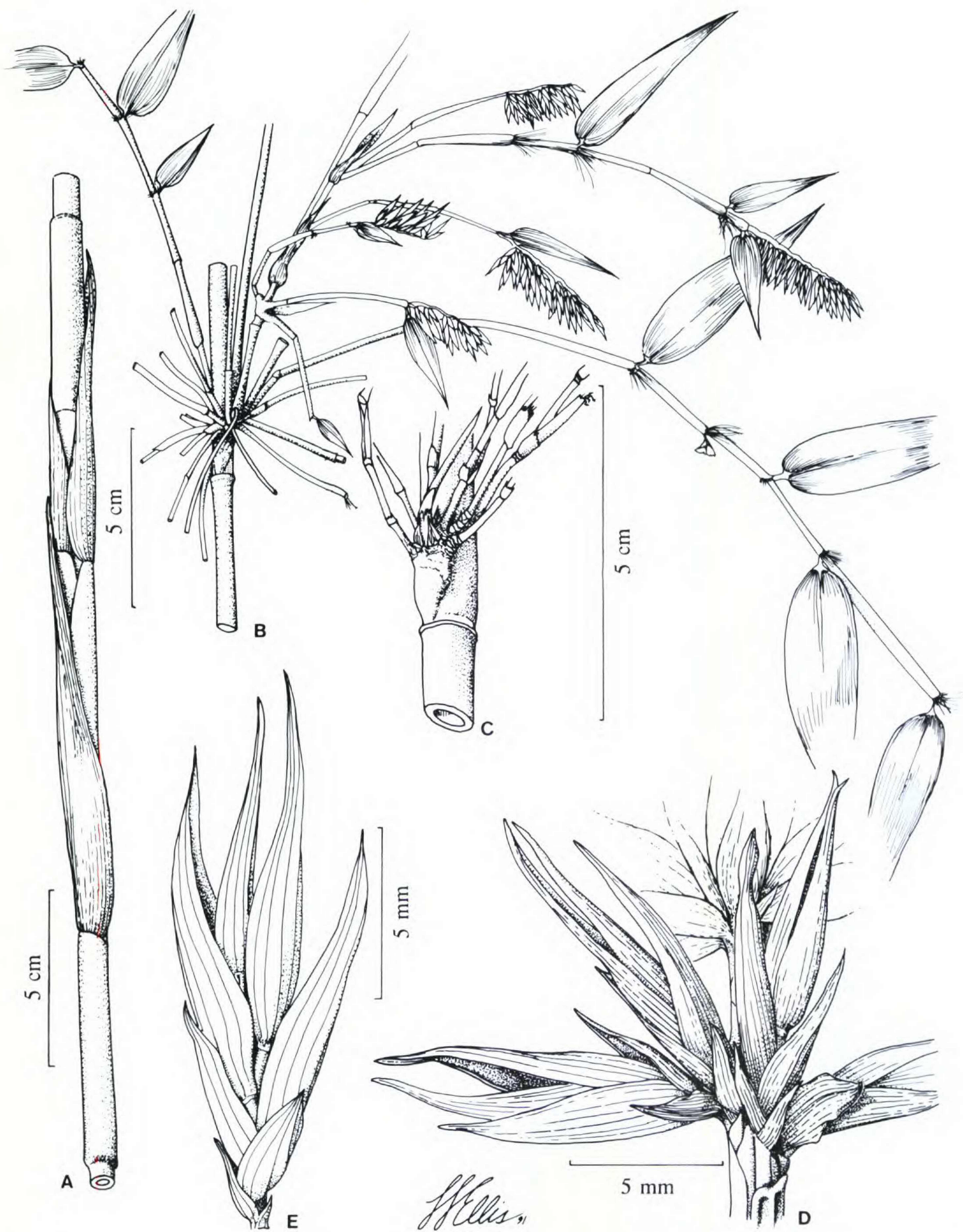


Figure 1. *Arthrostylidium merostachyoides* R. Pohl. —A. Young culm with culm leaves, the blades erect. —B. Flowering midculm branch complement. —C. Enlargement of a midculm branch complement showing the conspicuous promontory. —D. Rachis segment with two pairs of spikelets. —E. Spikelet. (A, B based on *Pohl & Clark 14613*; C based on *Pohl & Clark 14612*; D, E based on *Haber 2414*.)

2.5–4.5 mm longa munita; flosculis 2; flosculo inferno plerumque sterili interdum fertili, 9.5–10.5 mm longo arista 3.0–5.5 mm longa munita; flosculo superno fertili lemme 13–15 mm longo, indimidio superiore pubescenti

arista 4–5 mm longa munita, lodiculis 3, ciliatis, antheris 3, 8.5–9.0 mm longis, ovario glabro, stigmatibus 2; rhachilla ultra flosculum terminalem producta. Fructus non suppetens.

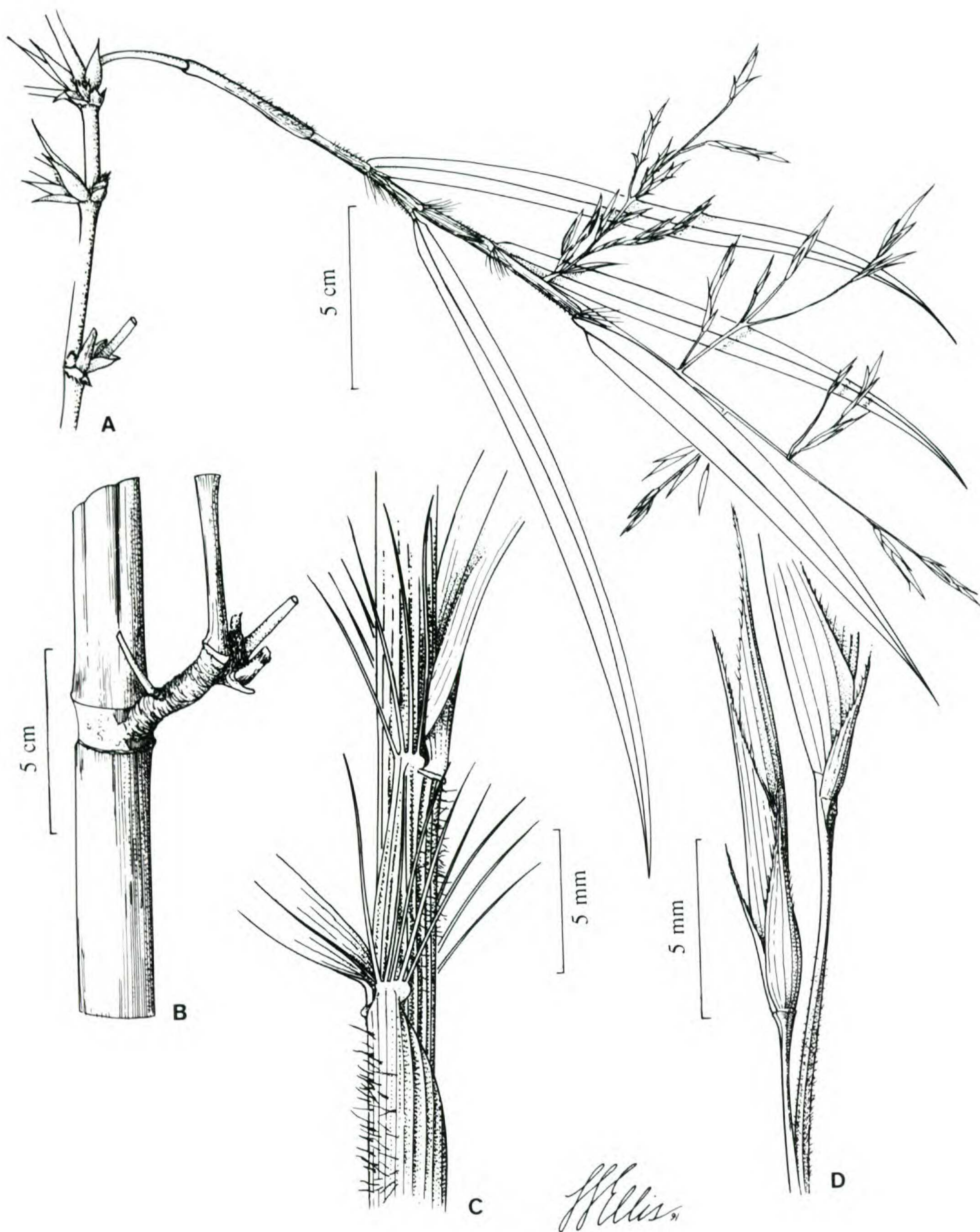


Figure 2. *Aulonemia clarkiae* Davidse & R. Pohl. —A. Flowering branch complement. —B. Midculm nodal complex with a single primary branch. —C. Ligular region of two branch leaves showing the prominent oral setae. —D. Spikelet. (A, C, D based on *Breedlove* 58512; B based on *Breedlove & Davidse* 55085.)

Caespitose, ligneous bamboo. Rhizomes 10–30 cm long, 6–15 mm thick, densely covered by scale leaves. Culms 5–8 m long, 1.0–1.6 cm diam., erect, solitary, hollow, cylindrical, glabrous, green, with thin walls, the upper portion pendent, producing

branches in the upper $\frac{3}{4}$. Culm leaves with long-persistent, stramineous, glabrous to papillose-pilose sheaths; auricles not developed; oral setae well-developed, 8–15 mm long, the central ones flattened at the base and borne on the back of the ligule, the

marginal ones cylindrical at the base and borne on the sheath apex; external ligule a minute rim; internal ligule a membrane 0.8–2.0 mm long, glabrous; blades reflexed to spreading, soon deciduous, narrower than the apex of the sheath, ciliolate. Branches intravaginal, 1 per node, the primary branches usually rebranching once or the larger midculm primary branches forming a fascicle of branches at the base. Branch leaves 4–8 per complement; sheaths of the lower leaves of a complement usually prominently papillose-hirsute with reddish brown, divergent hairs 1.5–3.0 mm long, ciliate with finer hairs on the margins, the upper sheaths of a complement puberulent or glabrous; external ligule a rim 0.1–0.2 mm long, sometimes irregular and to 0.8 mm long at the margin of the pseudopetiole; internal ligule a membrane 0.5–1.0 mm long, minutely ciliolate; auricles to 1 mm long on one side, poorly or not developed or absent on the other side; oral setae 7–15 mm long, prominent on each side of the pseudopetiole; pseudopetiole hardly differentiated; blades 10–36 cm long, 9–15 mm wide, linear-lanceolate, basally attenuate, apically long-attenuate, retrorsely scabrid above, puberulent and weakly tessellate below. Inflorescence a panicle 10–33 cm long, terminal on leafy branches; peduncle not exerted; rachis \pm triangular, puberulent and/or scabrous; primary branches to 15 cm long, solitary, widely divergent at maturity, prominently pulvinate, the pulvini swollen, brown, puberulent, the lowermost branch often subtended by a small bract; secondary branches few, primarily in the lower part of the panicle, pulvinate and divergent; pedicels glabrous, appressed to the panicle branches, the lateral ones 2–8 mm long. Spikelets 19–25 mm long, linear-lanceolate, 2-flowered with a prominent rachilla extension beyond the terminal floret; disarticulation above the glumes and between the florets; glumes 2, unequal, shortly awned, marginally ciliate in the upper $\frac{1}{2}$, the lower 3–5 mm long, 3-nerved, lanceolate, the awn 2.0–5.5 mm long, the upper 5.0–7.2 mm long, 5–7-nerved, lanceolate, the awn 2.5–4.5 mm long; lower floret usually sterile, rarely fertile and then similar to the upper floret; lower lemma 9.5–10.5 mm long, 11–13-nerved, marginally ciliate on the upper $\frac{1}{2}$, glabrous on the back, awned, the awn 3.0–5.5 mm long; lower palea usually 1.5–2.0 mm long, pubescent, subtending a rudimentary bisexual flower with stamens to 0.5 mm long and a minute pistil, rarely fully developed and similar to the upper palea and subtending a fully developed bisexual flower; rachilla internode between the florets 2.5–6.0 mm long, thickened upward, puberulent; upper floret bisexual; upper lemma 13–15 mm long, 11–13-nerved, tessellate-nerved

in the upper $\frac{3}{4}$, marginally ciliate in the upper $\frac{1}{2}$, puberulent on the back and/or on the sides in the upper $\frac{1}{2}$ and with the base shortly appressed-pubescent, awned, the awn 4–5 mm long; upper palea as long as the lemma, 4-nerved, 2-keeled and narrowly grooved between the keels, puberulent between and on the keels, glabrous or pubescent in the upper $\frac{1}{2}$ on the sides; rachilla extension 9.0–12.5 mm long, tightly held in the groove between the keels, without or with a minute, undifferentiated rudimentary floret 0.1–0.2 mm long, puberulent in the upper half and thickened toward the apex; lodicules 3, the 2 anterior ones 2.0–2.5 mm long, lanceolate, flat, slightly thicker at the base, ciliate in the upper $\frac{1}{2}$, obscurely nerved, the posterior one slightly smaller; stamens 3, the anthers 8.5–9.5 mm long; ovary cylindrical-fusiform, glabrous; stigmas 2. Fruit not available.

Paratypes. MEXICO. CHIAPAS: Municipio of Jitotol, 5 km SE of Jitotol along road to Bochil, open forest with *Pinus*, *Quercus*, *Nyssa*, *Liquidambar*, and *Brunellia*, 1,600 m, 9 Jan. 1981, *Breedlove & Keller 49359* (CAS), 10 Sep. 1981, *Breedlove 52658* (CAS, MO), 24 Feb. 1982, *Breedlove 5812* (CAS, MO, US).

This species is definitely known only from a single population in Chiapas, Mexico. It was first observed by Dennis E. Breedlove of the California Academy of Sciences, who discovered it coming into flower and who observed and collected it intermittently over a period of 16 months. Davidse revisited the locality in November 1984 and could not find a trace of the plants, neither adult plants nor seedlings, from which we tentatively conclude that this population died after flowering synchronously and did not produce viable seed.

This species was briefly discussed by Soderstrom (1988) when he described *Aulonemia fulgor* Soderstrom from Oaxaca. Soderstrom (pers. comm.) believed it to be a closely related, undescribed species, but his untimely death prevented him from pursuing his study of these collections to completion.

Aulonemia clarkiae differs from *A. fulgor* in its thicker and longer rhizomes, and, consequently, more diffuse spacing of the culms; taller (5–8 m vs. 5–6 m) and wider (1.0–1.6 cm vs. 0.5–1.0 cm), more strictly erect culms; puberulent versus glabrous lower leaf surfaces; usually sterile versus always fertile lower floret; pubescent versus glabrous upper lemma; and longer (8.5–9.5 mm vs. 6.0–7.0 mm) anthers.

Soderstrom (1988: 29, fig. 2) discussed and illustrated the rhizome system of the type collection of *A. fulgor* in detail. However, as noted by him, the description applies primarily to those decumbent culms that root at the nodes and may at times form

rhizomes. At Soderstrom's request, Davidse restudied the main rhizome system of *A. fulgor* in the field (Davidse *et al.* 30258) and found, as had been supposed by Soderstrom, that it is a sympodial system. In *A. fulgor* the slender, pachymorph rhizomes are generally 4–7 cm long before they turn upward to produce a new culm. Well-developed plants produce 20–30 loosely clumped culms. Those toward the outside of the clump tend to be more decumbent and more often root at the lower nodes. Although the basic rhizome system is similar in *A. clarkiae*, the rhizomes are much longer and thicker, and thus the culms are widely spaced and not truly clump-forming.

Soderstrom (1988: 30) characterized the plants that we are naming *A. clarkiae* as having three glumes and also noted that *Aulonemia*, sensu McClure (1973), has species with two or three glumes. The species pair here discussed clearly demonstrates that it is better to interpret the so-called three-glumed species as having two glumes and a sterile lemma in which the enclosed palea and flower have been totally lost through reduction. This becomes apparent from the following comparison. In *A. fulgor* all spikelets have two fully developed florets above the two glumes (Soderstrom, 1988). In contrast, in *A. clarkiae* two fully developed florets are rare. Much more common are two florets in which only the upper one is fully developed and in which the lower one usually has a fully developed lemma subtending a rudimentary palea and flower. By homology, other species of *Aulonemia* with a third empty bract represent a further step in this reduction series, namely, one in which the lowermost floret has been consistently reduced to a lemma.

For the reasons enumerated by Soderstrom (1988) we follow him in tentatively classifying this species in *Aulonemia*, even though the genus, as circumscribed by McClure (1973) and accepted by Calderón & Soderstrom (1980), is probably heterogeneous and is likely to be polyphyletic. As one of the discordant elements in a widely circumscribed *Aulonemia*, the *A. fulgor*–*A. clarkiae* species pair may deserve to be segregated as a distinct genus. It is another example of the need for an overall reassessment of generic classification mentioned in the discussion of *Arthrostylidium merostachyoides*.

The species is named for Lynn G. Clark, Iowa State University, in recognition of her outstanding contributions to agrostology, especially bamboos and *Chusquea* in particular.

The bamboo genus *Merostachys* is closely related to *Rhipidocladum*, both genera having branch complements arising from a triangular, flat, adnate mer-

istem in a fan-shaped array. They are conventionally distinguished by the reflexed culm blade in *Merostachys* and the erect blade in *Rhipidocladum* (McClure, 1973). While this structure is not known for the species described below, from the form of the inflorescences and nature of the spikelets, it is clearly a new species of *Merostachys*.

Merostachys latifolia R. Pohl, sp. nov. TYPE: Nicaragua. Jinotega: *W. D. Stevens & J. Heinrich 20418* (holotype, ISC; isotypes, BM, CAS, COL, CR, EAP, F, HNMN, K, L, MEXU, MO, NY, PMA, RB, SI, SP, US, VEN). Figure 3.

Bambusa lignosa caespitosa. Culmi 1.5–4 m longi, ad 8 mm diametro; nodis in medio culmi ramos ad 10 gerentibus. Folia culmorum ignota. Folia ramorum in complemento 2–6, laminis 15–20 cm longis, 2.8–4.9 cm latis, ovatis. Inflorescentia unilateralis, spicata, terminalis, 5–7 cm longa; rhachidi arcuata, ca. 1 mm lata, velutina. Spiculae singulares vel geminatae, falcatae, 10–13 mm longae; gluma inferna absenti; gluma superna 1.5–3.5 mm longa; flosculo inferno sterili, 4.7–7.0 mm longo ex lemmate 7-nervi tantum constanti; flosculo superno fertili lemmate 9–10 mm mutico; palea superna anguste sulcata inter carinas; rhachilla ultra flosculum terminale per 6.5–10.0 mm producta, in flosculum abortivum minutum terminanti. Flosculi sub anthesi etiam fructus non suppetentes.

Caespitose, ligneous bamboo. Rhizomes pachymorph. Culms 1.5–4.0 m long, to 8 mm diam., hollow, cylindrical, mottled with purple, asperous below the nodes; nodes retrorsely bearded. Culm leaves not known. Branches to 10 per node, to 45 cm long, including the inflorescence. Branch leaves 2–6 per complement; sheaths glabrous to puberulent; auricular bristles prominent, 10–15 mm long, also borne for several mm along the uppermost portion of the overlapping sheath margin; internal ligule 0.1–0.6 mm long, ciliate; pseudopetiole 6–10 mm long, flattened; blades 15–20 cm long, 2.8–4.9 cm wide, ovate, flat, dark green, glabrous but scabrid along one margin on the upper surface. Inflorescences 5–7 cm long, spikelike, terminal on leafy and bladeless lateral branches, slightly arcuate; rachis ca. 1 mm wide, densely velutinous. Spikelets 10–13 mm long, diverging from the rachis, solitary or paired, slightly falcate, slightly laterally compressed; lower glume absent; upper glume 1.5–3.5 mm long, triangular, 1-nerved; lower floret sterile, consisting only of a lemma 4.7–7.0 mm long, glabrous, 7-nerved; upper floret fertile, bisexual; upper lemma 9.0–10.0 mm long, 11-nerved, awnless, sparsely puberulent or shortly pubescent; upper palea 9.2–10.5 mm long, slightly longer than the lemma, narrowly grooved between the keels and tightly clasping the slender rachilla extension; rach-



Figure 3. *Merostachys latifolia* R. Pohl. — A. Flowering midculm branch complement. — B. Rachis segment with two spikelet pairs. — C. Fertile floret with rachilla extension bearing a minute rudimentary floret. (Based on *Moreno 16367*.)

illa extension 6.5–10.0 mm long, bristlelike, tipped with a minute rudimentary floret. Flowers and fruit not available.

Paratypes. HONDURAS. OLANCHO: Finca Santa Rosita, a 5 km al S del Campamento, 1 June 1985, *Téllez V. & Martínez S.* 8507 (MO). NICARAGUA. MATAGALPA: NW slope of Cerro El Picacho, ca. 13°00'N, 85°55'W, 25 May 1983, *Stevens & Moreno* 22117 (CR, HNMN, ISC, MO, US). JINOTEGA: km 146 carretera Matagalpa–Jinotega, 13°02'N, 85°56'W, 16 May 1982, *Moreno* 16367 (HNMN, MO, US). COSTA RICA. PUNTARENAS: Zapotel, Montes de Oro, May 1961, *Jiménez s.n.* (F, ISC, MO). ALAJUELA: La Palma de San Ramón, 17 Apr. 1927, *Brenes* 5433 (F).

Additional sterile collections. GUATEMALA. EL PROGRESO: Montaña Canahui, between Finca San Miguel and summit of mountain, near upper limits of Finca Caieta, 10 Feb. 1942, *Steyermark* 43772 (F). NICARAGUA. JINOTEGA: along Hwy. 3 from Jinotega to Matagalpa, ca. 5–8 mi. SW of Jinotega, 7 Aug. 1977, *Croat* 43057 (MO). PANAMA. COCLÉ: El Valle, 17 Jan. 1973, *Soderstrom* 2011 (MO). DARIÉN: along ascent of Serranía de Pirre, above Cana Gold Mine, between Río Cana and Río Escucha Ruida, 27 July 1976, *Croat* 37779 (MO).

This species grows in the understory of cloud forests at 1,100–2,300 m. The type collection and all the paratypes are post-anthesis specimens. The cited sterile collections are also tentatively identified as this species, but we await the collection of fertile specimens from these areas for confirmation. Other sterile collections of *Merostachys*, in addition to the cited ones, are known from Mesoamerica, but they probably represent other species and are too fragmentary for positive identification.

This is the species described by McClure in Swallen (1955: 207) under the name *M. argyronema* Lindman (1900). This Brazilian species differs in having branch leaf blades 9–12 (not 15–20) cm long and 1.2–1.6 (not 2.8–4.9) cm wide, up to 29 (not to 10) branches at the midculm nodes, 7–8 (not 2–6) branch leaves per complement, solitary (not paired) spikelets, and lower lemma 5-nerved (not 7-nerved). Lindman did not indicate either in his description or illustration the presence of the prominent elongated rachilla internode clasped by the palea in spikelets of *M. latifolia*, but this is characteristic of every known species in the genus.

The genus is primarily Brazilian with more than 30 species, including a number of undescribed ones. Among the broad-bladed species with strongly unilateral racemes with primarily paired spikelets, *M. latifolia* resembles *M. riedeliana* Rupr. but has much shorter spikelets (10–13 vs. ca. 18 mm), and shorter, acute sterile lemmas (4.7–7.0 vs. 12–14 mm and short-awned). However, the genus is so little understood that it is difficult to assess relationships.

Rhipidocladum martinezii Davidse & R. Pohl, sp. nov. TYPE: Mexico. Chiapas: Mun. Unión Juárez, en el volcán Tacaná, a 5 km al S de Talquián, 1,550–1,700 m, bosque mesófilo de montaña, arbusto voluble, flor amarilla con estambres morados y fruto, 8 Feb. 1987, *E. Martínez S., A. Márquez, G. Urquijo & M. Ramírez* 19767 (holotype, MO; isotype, MEXU). Figure 4.

Bambusa lignosa caespitosa. Culmi 8–16 mm diametro; nodis in medio culmi ramos 100–200 gerentibus. Folia culmorum ignotae. Folia ramorum laminis 4–8 cm longis, 2.5–3.5 mm latis. Inflorescentia unilateralis racemosa, terminalis, 2–4 cm longa, glabra, spiculas 2–4 gerens. Spiculae 25–30 mm longae; gluma inferna 2.5–7.0 mm longa arista 2–3 mm longa munita; gluma superna 6–11 mm longa arista 2.5–3.5 mm longa munita; flosculo infimo sterili, lemmate 12–15 mm longo, arista 3–5 mm longa; flosculis fertilibus 2–4, lemmate 12–19 mm longo, scaberulo, arista 3–6 mm longa, lodiculis 3, glabris, antheris 3, 6–7 mm longis, stylo 1, stigmatibus 2. Caryopsis 5.5–6.1 mm longa, 1.0–1.2 mm lata; hilo caryopside aequilongo.

Caespitose, ligneous bamboo. Rhizome pachymorph. Culm length unknown; internodes 8–16 mm diam., relatively thin-walled, hollow, cylindrical, glabrous. Culm leaves unknown. Primary branch element flat, triangular, adnate to the main culm, bearing 100–200 flowering branches at midculm nodes; flowering branches 10–30 cm long, glabrous, leafy or leafless toward the tips of the main culm, branched or unbranched, thin and delicate, the leafless branches mostly 4–5 cm long, bearing 2–4 spikelets. Branch leaves 2–5 per complement; sheaths glabrous, truncate; oral setae 1.5–2.5 mm long, flexuous; external ligule a rim; internal ligule 0.1–0.3 mm long, membranous, ciliolate; pseudopetiole 1.0–1.3 mm long, 0.2–0.3 mm wide, glabrous; blades 4–8 cm long, 2.5–3.5 mm wide, linear-lanceolate, flat, sparsely puberulent at the base below, often scaberulous near one margin above, otherwise glabrous. Inflorescence a solitary, unilateral raceme bearing 2–4 spikelets; peduncle scarcely exerted, puberulent; rachis 2–4 cm long, glabrous, the internodes 8–15 mm long; pedicels to 0.5 mm long, appressed. Spikelets 25–30 mm long, appressed, disarticulating above the lowest, sterile floret and between the 2–4 fertile, bisexual florets; florets 4–7, the lowest sterile, the uppermost 1 or 2 staminate or sterile, the terminal one usually rudimentary; lower glume sometimes lacking entirely in terminal spikelets, when present usually 2.5–7.0 mm long including a 2–3-mm-long awn, narrowly lanceolate, 1-nerved; upper glume 6–11 mm long including a 2.5–3.5-mm-long awn, lanceolate, 5–7-nerved, glabrous; rachilla internodes 2.7–4.5 mm long, glabrous; lower floret re-

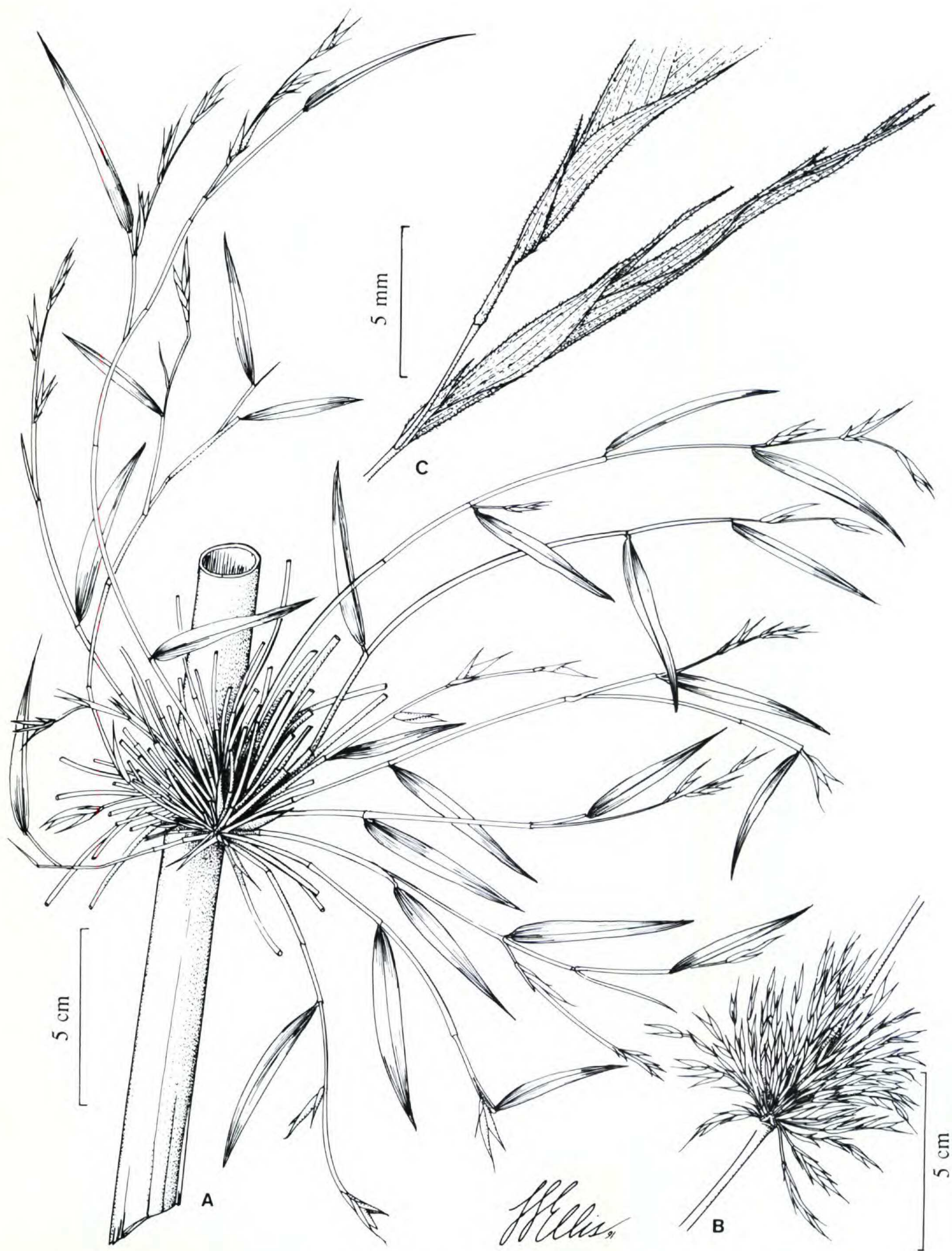


Figure 4. *Rhipidocladum martinezii* Davidse & R. Pohl. — A. Leafy flowering midculm branch complement. — B. Leafless, flowering branch complement. — C. Spikelet. (A based on *Martínez et al.* 20286; B, C based on *Martínez et al.* 19767.)

duced to a lemma 12–15 mm long including a 3–5-mm-long awn, lanceolate, 7–9-nerved, scaberulous on the upper $\frac{2}{3}$; fertile lemmas 12–19 mm long including a 3–6-mm-long awn, lanceolate, attenuate, 7–9-nerved, scaberulous in the upper $\frac{2}{3}$; fertile paleas 9.5–10 mm long, as long as or distinctly shorter than the fertile lemmas, 4–6-nerved, 2-keeled, ciliolate in the upper $\frac{1}{3}$ on the keels; callus knoblike; lodicules 3, the two posterior ca. 2 mm long, flat, somewhat thickened at the base, lanceolate but with one side straight, glabrous, the upper margin sparsely ciliolate, the anterior one narrower, linear; stamens 3, the anthers 6–7 mm long; style 1; stigmas 2; ovary linear-lanceolate. Caryopsis 5.5–6.1 mm long, 1.0–1.2 mm wide, flattened and slightly grooved on the hilar side, rounded on the embryo side, dark brown; embryo ca. 1 mm long; hilum as long as the caryopsis.

Paratypes. MEXICO. CHIAPAS: Mun. Unión Juárez, Volcán Tacaná, 5 km al S de Talquián, 8 Feb. 1987, *Martínez et al.* 19813 (MEXU, MO); Mun. Unión Juárez, Volcán Tacaná, 5 km al E de Talquián, 26 abr. 1987, *Martínez S. & Reyes* 20286 (MEXU, MO).

This species is known only from the type locality on Volcán Tacaná, the large volcano straddling the Mexican–Guatemalan border.

This species is most closely related to *Rhipidocladum clarkiae* R. Pohl, *R. panamense* R. Pohl, and *R. sibilans* Davidse, Judz. & L. Clark, narrow endemics of Costa Rica, Panama, and eastern Venezuela and western Guyana, respectively. All four species occur in montane forests. They may be more widespread than present evidence indicates since their infrequent flowering has no doubt discouraged collectors. They may have arisen from a common widespread ancestor that differentiated through isolation in widely separated mountain ranges or, perhaps more likely, they differentiated as new isolated populations from a common ancestor as it spread into previously uninhabited mountain ranges.

Rhipidocladum martinezii resembles *R. clarkiae*, *R. panamense*, and especially *R. sibilans* in its numerous branches per node, small leaf blades, and obviously awned spikelets. The new species differs from *R. clarkiae* in its smaller inflorescences bearing fewer (2–4 vs. 7–8) spikelets per raceme with glabrous versus puberulent rachises, more attenuate, less heavily scabrous lemmas, longer (6–7 vs. ca. 4.5 mm) anthers, and narrower (2.5–3.5 vs. 4–9 mm) branch leaves. *Rhipidocladum martinezii* differs from *R. panamense* in its smaller inflorescences bearing fewer (2–4 vs. 5–7) spikelets per raceme, longer (9.5–12.0 vs. 5.0–6.5 mm) much more attenuate lemma body, and longer an-

thers. *Rhipidocladum martinezii* differs from *R. sibilans* in its secund (vs. bilateral) raceme with the spikelets more closely spaced (rachis internodes 0.8–1.5 vs. 1.9–3.0 cm long) and glabrous (vs. densely puberulent) rachilla internodes.

This species is named in honor of Esteban Martínez S., Universidad Nacional Autónoma de México, a prolific plant collector and discoverer of many interesting new plants for the flora of Mexico, including all known collections of this new species.

BAMBUSEAE: GUADUINAE

We follow Soderstrom & Londoño (1987) and Soderstrom & Ellis (1987) in recognizing New World *Guadua* Kunth as distinct from the Old World *Bambusa* Schreber, thus necessitating the following new combination.

Guadua longifolia (Fourn.) R. Pohl, comb. nov.

Basionym: *Arundinaria longifolia* Fourn., *Mexic. Pl.* 2: 131. 1886. *Bambusa longifolia* (Fourn.) McClure, *Smithsonian Contr. Bot.* 9: 66. 1973. TYPE: Mexico. Jicaltepec, April, *Liebmann s.n.* (holotype, C).

Arthrostylidium spinosum Swallen, *J. Wash. Acad. Sci.* 28: 6. 1938. *Guadua spinosa* (Swallen) McClure, *Phytologia* 5: 82. 1954, non *Bambusa spinosa* Roxb. ex Buch.-Ham., *Trans. Linn. Soc. London* 13: 480. 1822. *Bambusa swalleniana* McClure, *Smithsonian Contr. Bot.* 9: 68. 1973. TYPE: Belize. El Cayo District: along Belize River at El Cayo, June–Aug. 1936, *Lundell* 6939 (holotype, US; isotype, MO).

Guadua macclurei R. Pohl & Davidse, sp. nov.

TYPE: Honduras. Gracias a Dios: along Río Plátano S of Ras, Moravian Mission settlement called Las Marías or Batituk, elev. 50 m, culms over 10 m long, arching, with numerous elongate spreading branches, this colony vegetative except for one branch 1.5 m long, species is abundant along lower Río Plátano, some colonies blooming, 16 Dec. 1977, *R. W. Pohl & M. Gabel* 13340 (holotype, ISC; isotypes, F, MO). Figure 5.

Bambusa lignosa spinosa. Culmi cylindrici cavi, 6–15 m longi, 3–4 cm diametro; nodis supra et infra cristam nodalem annulos trichomatum alborum gerentibus, in medio culmi ramos singulares gerentibus. Folia culmorum vaginis hispidis plerumque exauriculatis interdum auriculato-setosis, deciduis; laminis 7–14 cm longis adaxialiter hispidis trichomatibus plerumque albis. Folia ramorum vaginis auriculis 5.0–8.5 mm longis, lineari-falcatis plerumque munitis; laminis 13–26 cm longis, 1.6–4.8 cm latis, lanceolatis. Inflorescentia rhachidi gracili efoliata usque ad 30 cm longa fasciculos densos numerosos pseudospicularum sessilium gerenti. Pseudospiculae 10–15 mm



Figure 5. *Guadua macclurei* R. Pohl & Davidse. —A. Vegetative branch complement. —B. Culm leaf. —C. Branch leaf detail showing prominent auricles. —D. Flowering branch with clusters of pseudospikelets. —E. Flowering branch originating from a pseudospikelet. —F. Spikelet. (A–C based on *McClure 21476*; D–F based on *Pohl & Gabel 13340*.)

longae, ca. 3 mm latae; flosculo fertili plerumque unico; lemmate 8.5–9.0 mm longo; lodiculis 3, puberulentis; antheris 6, ca. 5 mm longis; stigmatibus 3. Fructus non suppetens.

Caespitose, ligneous, spiny bamboo. Rhizomes short, pachymorph. Culms 6–15 m long, 3–4 cm diam., arching, pendulous above; internodes to 55 cm long, green, sparsely appressed pubescent, hollow, cylindrical, thin-walled; nodes not prominent, with white pubescent bands above and below the nodal ridge. Culm leaves tardily deciduous; sheaths 7–23 cm long, appressed-hispid with white hairs, usually lacking auricles and auricular setae, rarely with linear auricles to 9 mm long bearing prominent setae; internal ligule 1.5–2 mm long, stiff, membranous, minutely ciliate; blades 7–14 cm long, as broad as the sheath apex, erect, broadly triangular, apiculate, ciliate, densely appressed-hispid above, sparsely hispid toward the margins below, the hairs usually white or sometimes brown toward the base, the base long-decurrent on one margin. Branch complement consisting of a single primary branch, the lowest nodes bearing 1–several hooked thorns or secondary branches. Branch leaves with the sheaths ciliate, glabrous to hispid on the back; auricles 5–8.5 mm long, linear-falcate, sometimes deciduous or absent; auricular setae 5–9 mm long; external ligule a rim 0.1–0.3 mm long; internal ligule 0.1–0.4 mm long, membranous; pseudopetiole 1.5–2.5 mm long, pilose above; blades 13–26 cm long, 1.6–4.8 cm wide, flat, lanceolate, mostly glabrous, ciliate. Inflorescence axis to 30 cm, slender, leafless, bearing numerous dense fascicles of sessile pseudospikelets. Pseudospikelets 10–15 mm long, ca. 3 mm wide; basal bracts 2–4, 2–5.5 mm long, similar to the glumes, often subtending axillary pseudospikelets in several orders; each pseudospikelet terminating in a spikelet that disarticulates below its glumes; lower glume 6.0–7.5 mm long, ovate, 11–13-nerved, the apex with a stiff beak ca. 1 mm long; upper glume 8.0–8.7 mm long, similar to the lower glume; bisexual floret usually 1; lemma 8.5–9.0 mm long, 11–15-nerved, broad, apiculate, densely puberulent adaxially in the upper $\frac{1}{2}$; palea broad, outwardly bowed, 8–10-nerved, about as long as the lemma, 2-keeled, the margins each 3-nerved, the keels broadly winged, the wings to 1.5 mm wide, eciliate, completely enfolding the terminal rachilla internode; rachilla stiff, 3–5 mm long, bearing a cylindrical rudiment 3.5–5 mm long; lodicules 3, flat, vasculated, puberulent on the back; stamens 6, the anthers ca. 5 mm long, yellow; stigmas 3. Fruit not available. $2n = 48$.

Paratypes. NICARAGUA. ZELAYA: Bluefields, El Recreo, Agricultural Experiment Station, growing wild, forming

isolated colonies of limited extent on upland in quebradas and second-growth jungle, branches all thorny, culms used locally in construction of shade shelters for nursery plants, known locally as “Cuajichote,” 23 Jan. 1946, *McClure 21476* (ISC, MO, US), 25 Jan. 1946, *McClure 21479* (MO); road crossing of Río Likus, 1.5 m SE of La Tronquera, S of Waspam, 6 Aug. 1971, *Pohl & Erickson 12700* in part (MO-2613073). HONDURAS. GRACIAS A DIOS: Leymus, orilla del río Segovia o Wankí, 100 km SO de Puerto Lempira, 1 Feb. 1984, *Nelson & Cruz 8696* (MO).

Additional sterile collections tentatively identified as this species and not considered to be paratypes nor used in writing the description are the following: NICARAGUA. ZELAYA: ca. 0.5 km upstream from first suspension bridge over Río Sucio, also known as Río Tunky, E of Rosita, ca. 13°58'N, 84°28'W, 22 Feb. 1979, *Stevens 12606* (MO); along new road between Rosita and Puerto Cabezas, ca. 15.7 km SW of Río Kukalaya, ca. 13°58'N, 84°12'W, 30 Apr. 1978, *Stevens 8464* (MO); ca. 3.9 km SE of El Empalme on road to Limbaika, ca. 13°39'N, 84°24'W, 25 Apr. 1978, *Stevens 8122* (MO). COSTA RICA. PUNTARENAS: Piedras Blancas, edge of road in lowland forests along Carretera Interamericana, 19 July 1966, *Pohl & Calderón 10103* (MO). PANAMA. BARRO COLORADO ISLAND: 5 Mar. 1983, *Judzewicz 4438* (MO, WIS), 30 Apr. 1970, *Croat 10101* (MO). DARIÉN: along Pan-American Highway between Pucro and Río Punusa, 3 Aug. 1962, *Duke 5401* (MO).

This species is known with certainty only from gallery forests along rivers in the Caribbean coastal plain of Honduras and Nicaragua at an elevation below 100 m. The additional sterile collections cited from Costa Rica and Panama await flowering collections for confirmation. This species is named for F. A. McClure, distinguished student of bamboos, who recognized this species as distinct and gave it a manuscript name, which is unfortunately a later homonym. His detailed notes on vegetative specimens collected at Bluefields, Nicaragua, and portions of his manuscript description have been incorporated into this treatment. The one flowering specimen available to McClure was immature, and some of his statements about the pseudospikelet and spikelet details are not correct.

This species is unusual in the genus in having spikelets with only one or at most a few bisexual florets. Vegetatively it most resembles *G. amplexifolia*, but *G. macclurei* differs in the usually white (not brown) hairs on the upper surface of the culm leaf blades, the frequent occurrence of linear-falcate (not triangular) setose auricles on the branch leaf sheaths, the relatively thinner culm walls, and most notably, in the much narrower pseudospikelets (ca. 3 mm vs. 4–5 mm wide).

OLYREAE

Arberella grayumii Davidse, sp. nov. TYPE: Costa Rica. Puntarenas: along new road from Pie-

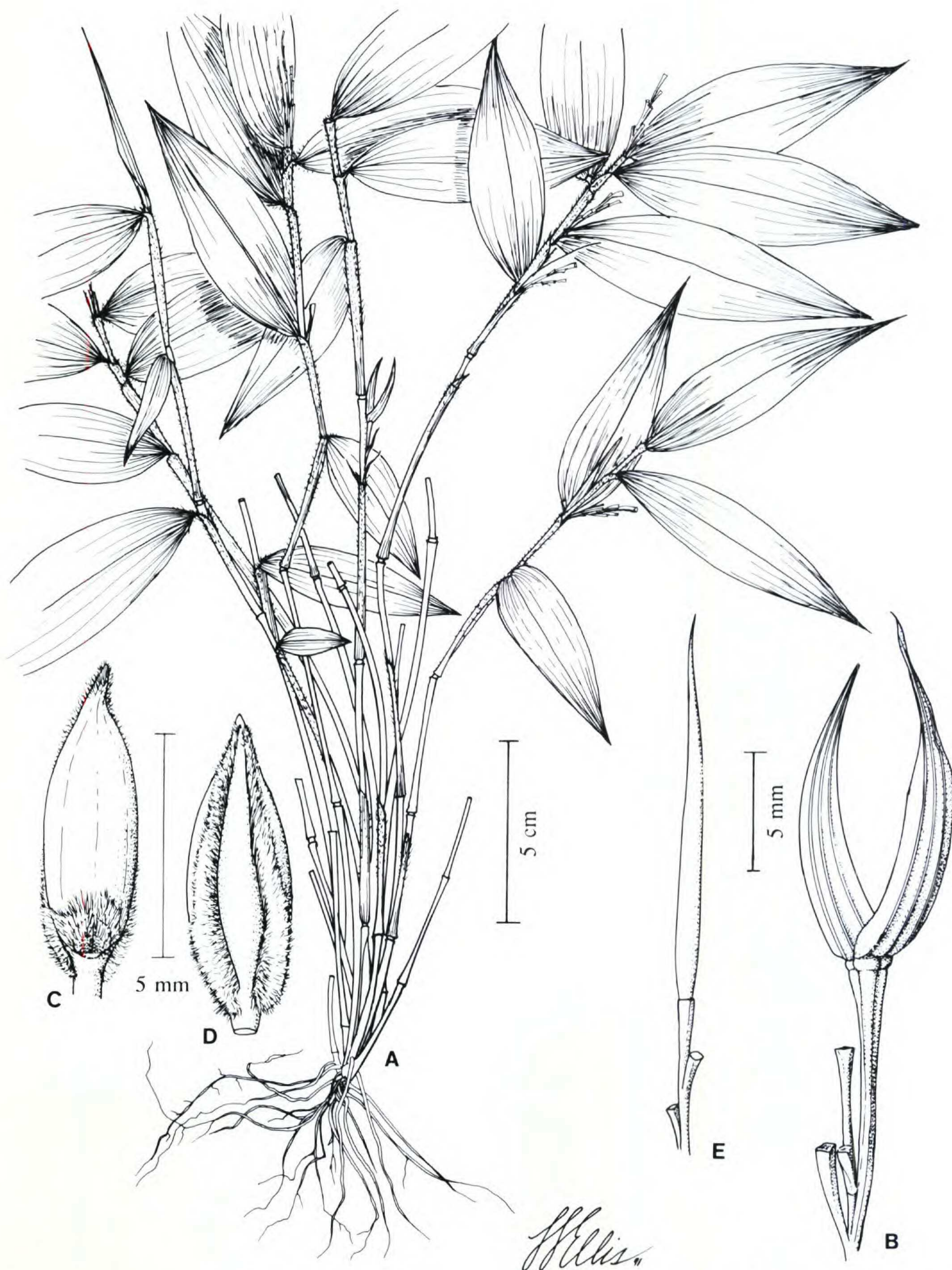


Figure 6. *Arberella grayumii* Davidse. —A. Habit. —B. Inflorescence with terminal female spikelets with only the glumes remaining and the anthoecium dehiscent. C, D. Female anthoecium. —C. Dorsal view showing the pubescence around the germination flap. —D. Ventral view showing the prominently ciliate lemma margins. —E. Male inflorescence with terminal male spikelet. (Based on *Grayum et al.* 3402.)

dras Blancas to Rincón de Osa, 8°45'N, 83°21'W, ca. 200 m, scattered on forest floor, 2 July 1984, *M. H. Grayum, B. Jacobs, G. Schatz, J. Kress & P. Sleeper 3402* (holotype, MO; isotypes, CR, US). Figure 6.

Gramen perenne. Folia evoluta in quoque culmo 5–8; vaginis ciliatis et pilosis; pseudopetiole 1.0–1.5 mm longo; laminis 5–10 cm longis, 1.6–3.0 cm latis, oblongo-ellipticis, apice acuminatis, basi asymmetricis. Paniculae ad quemque nodum medianum et supernum 1–5, 1.5–4.0 cm longae. Spiculae masculae 3.8–5.2 mm longae. Spiculae femineae lanceolatae, 13.5–15 mm longae, ca. 2.5 mm latae; gluma inferna 7-nervi, superna 7-nervi; inter gluma anthoeciumque internodio ca. 1 mm; lemmate ca. 8.7 mm longo, 2.3 mm lato, ciliato dense pubescenti circum operculum germinationis; palea 4-nervi, glabra. Caryopsis non suppetens.

Caespitose, perennial herb. Culms 35–50 cm long, unbranched, erect or geniculate-ascending; internodes terete, shiny, glabrous, hollow, with a gland-like spot on one side toward the apex; exposed nodes 4–5, blackish, glabrous, formed from the thickened basal rim of the sheath above and the thickened upper rim of the internode below. Leaves of the basal nodes consisting of only a sheath shorter than the internode; fully developed leaves 5–8 per culm; sheaths green-mottled, hirsute in the upper half, ciliate; ligule a ciliolate membrane 0.2–0.4 mm long; pseudopetiole 1.0–1.5 mm long, pilose with white hairs on both surfaces; blades 5–10 cm long, 1.6–3.0 cm wide, oblong-elliptic, sparsely to moderately pilose below, glabrous to sparsely pilose above, ciliate, acuminate, basally asymmetrical, the midrib on both surfaces thickened at the base and terminating in a knoblike process. Panicles 1–5 from each of the middle to uppermost nodes, 1.5–4.0 cm long, narrow, erect, with a single large terminal female spikelet and ca. 8–16 paired male spikelets below, one of each pair long-pedicelled, the other short-pedicelled, or the female spikelet lacking and only male spikelets present; axis angular, glabrous; pedicels glabrous, those of the female spikelets prominently thickened at the apex, those of the male spikelets only slightly thickened. Male spikelets 3.8–5.2 mm long, 0.5–0.6 mm wide, linear-lanceolate, acuminate, glabrous, membranous, whitish; lemma 3-nerved, acuminate with an awn tip to 0.5 mm long; palea as long as the lemma body, 2-nerved; lodicules 3, 0.4–0.5 mm long, similar, oblanceolate; stamens 3, the anthers 1.2–1.6 mm long, basifixed. Female spikelets 13.5–15.0 mm long, ca. 2.5 mm wide, lanceolate, long-attenuate, glabrous, whitish; glumes subequal, membranous, longer than the anthoecium, 7-nerved, with a few transverse veinlets; anthoecium ca. 8.7 mm long and 2.3 mm wide, oblong-elliptic, the internode ca. 1.0 mm long; lem-

ma smooth and shiny, whitish when immature, densely and prominently ciliate, also densely pubescent on the germination flap and just above the flap on the back; palea 4-nerved, glabrous; lodicules 3, ca. 1 mm long, vasculated, the posterior one and one of the anterior ones marginally connate, the free anterior one \pm dumbbell-shaped; ovary fusiform, ca. 2.8 mm long; style 1, as long as the anthoecium; stigmas not seen. Caryopsis not available.

Arberella Soderstrom & C. Calderón is a small genus of five closely related species, plus the distantly related *A. bahiensis* Soderstrom, the only species that lacks the elongated internode between the glumes and anthoecium (cf. Soderstrom & Zuloaga, 1985). *Arberella grayumii* differs from all the glabrous-leaved species (*A. bahiensis*, *A. flaccida* (Doell) Soderstrom & Zuloaga, *A. dressleri* Soderstrom & C. Calderón) in its much broader blades, glabrous female palea, and different pubescence pattern on the back of the female lemma.

In Mesoamerica the four known species of *Arberella* occur only in tropical wet forests and have very limited distributions: *A. grayumii* is only known from the Osa Peninsula on the Pacific side of Costa Rica; *A. costaricensis* (A. Hitchc.) Soderstrom & C. Calderón is only known in the Río Hondo area on the Atlantic side of Costa Rica; *A. dressleri* is known from eastern Colón and western San Blas, Panama, on both sides of the continental divide but is most common on the Caribbean side; and *A. lancifolia* Soderstrom & Zuloaga is the most widespread Mesoamerican species, ranging from San Blas to Bocas del Toro, Panama. *Arberella lancifolia* occurs only along the Caribbean slope in the western part of its range but crosses the lower continental divide in the eastern part of its range.

This species is named for Michael H. Grayum, Missouri Botanical Garden, in recognition of his outstanding work on the flora of Costa Rica. It is only known from the type collection.

Cryptochloa soderstromii Davidse, sp. nov.

TYPE: Panama. San Blas: Ailigandi, area along trail from ocean to waterfall on river, 0–200 ft., culms clumped, to 1 m tall, leaves dark green matte above, burgundy below, on slope along river, 7 Oct. 1978, *B. Hammel & W. G. D'Arcy 4984* (holotype, MO; isotype, US). Figure 7.

Gramen perenne. Culmi 60–100 cm longi. Folia in complemento 7–9, scaberula; vaginis auriculatis marginibus glabris; ligula 2–8 mm longa, asymmetrica; laminis 10–13 cm longis, 3–4 cm latis, oblongo-elliptico-ovatis.

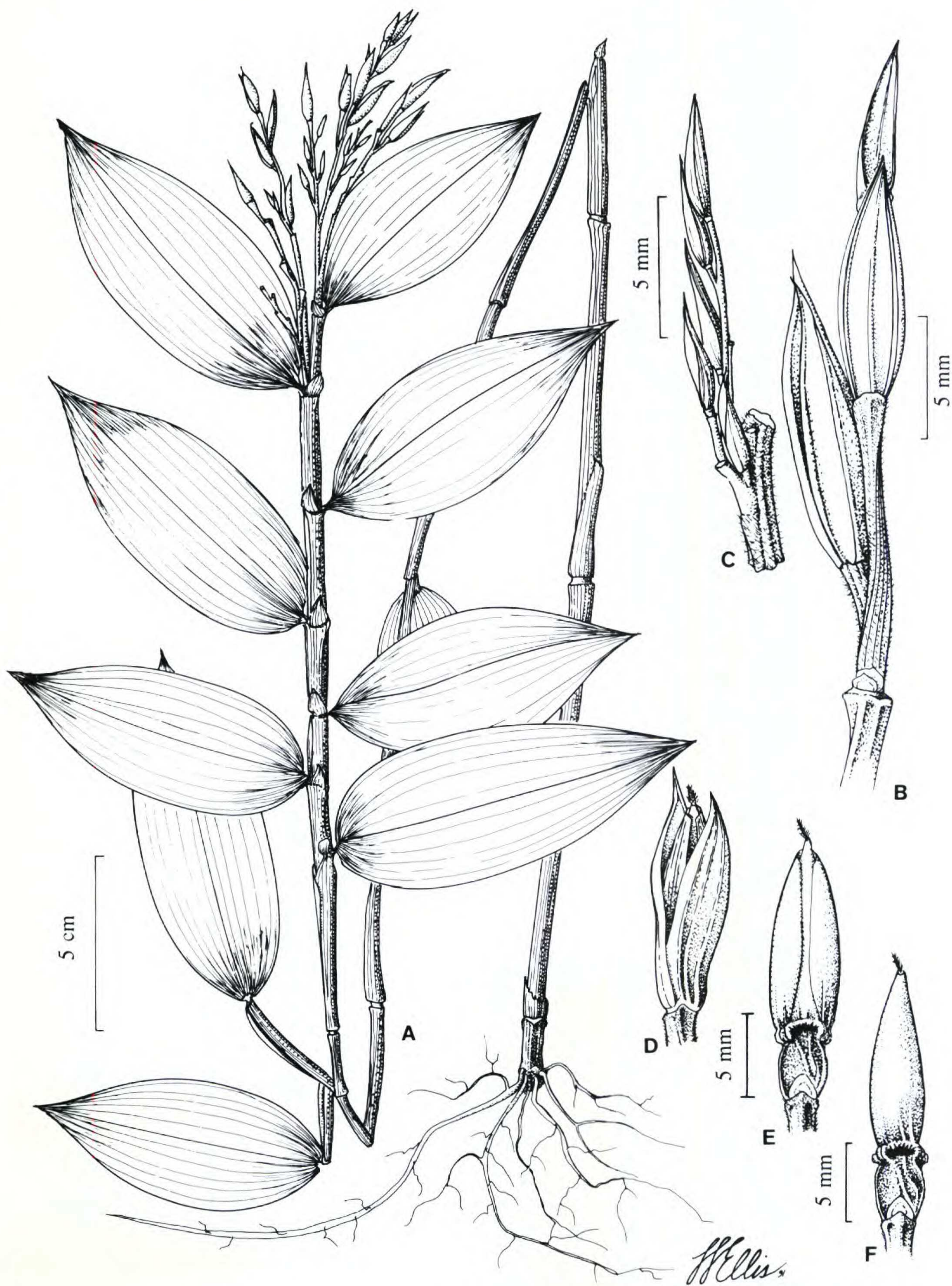


Figure 7. *Cryptochloa soderstromii* Davidse. —A. Habit. —B. Portion of inflorescence with female spikelets. —C. Portion of inflorescence with male spikelets. —D. Female spikelets. E, F. Female anthoecium (immature) with prominent basal internode. —E. Ventral view. —F. Dorsal view. (Based on Hammel & D'Arcy 4984.)

Inflorescentiae paniculatae, ad quaque nodum foliarem 2–3, terminales et axillares, spiculas femineas apicem versus et masculas basim versus gerentes. Spiculae masculae 3.5–5.0 mm longae muticae; antheris 3, 3.3–3.6 mm longis. Spiculae femineae 9–13 mm longae; glumis 7–9-nervibus acutis vel aristatis ad 1–3 mm; flosculo 7.8–8.3 mm longo, 1.9–2.0 mm lato. Caryopsis non suppetens.

Caespitose, perennial herb. Culms 60–100 cm long, erect, with up to 6 elongated internodes bearing sheaths without or with reduced blades preceding the section of the culm bearing the leaf complement; internodes hollow, glabrous or sparsely scaberulous between the veins at the apex, longer than the associated sheath in the lower half, shorter in the leaf complement; nodes glabrous to appressed scaberulous. Leaves with developed blades 7–9 per complement, scaberulous; sheaths prominently auricled, the auricle adnate to the ligule, the margins glabrous; ligule asymmetrical, 5–8 mm on the underlapping side of the sheath, 2–3 mm on the overlapping side, membranous, glabrous on the back, ciliolate; pseudopetiole ca. 1.5 mm long, scabrous; blades 10–13 cm long, 3–4 cm wide, oblong- to elliptic-ovate, glabrous, basally rounded, slightly asymmetric, apically abruptly acuminate. Panicles terminal and axillary, 2–3 from each of the uppermost leafy nodes, bearing female spikelets toward the tip and male spikelets toward the base; peduncles not exerted from the sheath; branches appressed, scaberulous, ridged; female pedicels thickened at the tip, solitary; male pedicels slender at the tip, solitary or in short- and long-pedicelled pairs. Male spikelets 3.5–5.0 mm long, awnless, disarticulating immediately after anthesis as one unit, glabrous; lemma and palea subequal; lemma 3-nerved; palea 2-nerved; lodicules 3, truncate; stamens 3, the anthers 3.3–3.6 mm long. Female spikelets 9–13 mm long including the awn tips, fusiform, disarticulating above the glumes; glumes as long as the spikelet, 7–9-nerved, glabrous without, scabrous in the upper $\frac{1}{2}$, with 3 strong nerves and 4 or 6 weak ones near the margin, with transverse veinlets, the lower acute or with an awn tip to 3 mm long, the upper acute or with an awn tip to 1 mm long; internode between the glumes and anthoecium 1.6–2.2 mm long; anthoecium 7.8–8.3 mm long, 1.9–2.0 mm wide, shiny; lemma 5-nerved; palea 2-nerved, nearly as long as the lemma; lodicules 3, truncate, vasculated, eciliate; style 1, as long as the anthoecium; stigmas 2; caryopsis not available.

Cryptochloa soderstromii is very closely related to the South American *C. capillata* (Trin.) Soderstrom but differs in its smaller (3.5–5.0 mm vs. 6.0–9.0 mm), essentially awnless, male spikelets,

eciliate sheath margins, smaller female spikelets (9–13 mm vs. 20–23 mm) with essentially awnless glumes or with the lower glume sometimes with an awn point to 3 mm long, and inflorescence branches more appressed, somewhat thicker, and not as highly branched.

It is similar to *C. capillata* in its large size, similar leaves with similar ligules, and paniculate terminal inflorescences. In *C. soderstromii* the terminal inflorescence bears both male and female spikelets.

In *C. capillata*, as Soderstrom (1982) noted when he transferred this species to *Cryptochloa* Swallen from *Olyra* L., the terminal panicle may bear a mixture of male and female spikelets, or it may be uniformly unisexual, in which case it usually bears male spikelets, or only rarely female spikelets. In other species of *Cryptochloa* the terminal inflorescences are nearly always male, and they are usually much smaller. Whether *C. soderstromii* also usually produces terminal male inflorescences awaits further observations on new collections.

The species is named for the late Thomas R. Soderstrom, who through his careful work and great enthusiasm for the herbaceous bamboos, greatly increased our understanding of this group. It is known only from the type collection.

PARIANEAE

The genus *Pariana* Aublet consists of approximately 38 species distributed in lowland and lower montane rainforests from Costa Rica (and probably southern Nicaragua) south to Brazil and Bolivia. It is especially abundant in the Amazon Basin. Victoria C. Hollowell is currently monographing the genus.

It is not surprising that a new species needs to be described since Costa Rica–Panama is one of the major centers of bamboo diversity in the Neotropics, with many species still awaiting description (Soderstrom et al., 1988).

***Pariana argentea* Hollowell & Davidse, sp. nov.**

TYPE: Panama. Panamá: El Llano–Cartí Road, 4 mi. beyond the (Pan-American) Highway, 500 m, in shade of forest, spikes green, the stamens yellow, 5 Dec. 1979, T. B. Croat 49139 (holotype, MO).

Gramen perenne rhizomatibus brevibus. Culmi dimorphi; culmi steriles ad 40 cm longi, erecti vel geniculati, ascendentes; culmi fertiles ad 20 cm longi, decumbentes. Folia vaginis truncatis, fimbriatis, hirtellis; laminis linearibus vel lineari-lanceolatis, adaxialiter viridibus, abaxialiter manifeste argenteo-glaucis. Inflorescentiae spiciformes, ad 4.3 cm, terminales, graciles, gynecandrae, ex verticillis spicularum dimorpharum constantes. Spiculae masculae flosculum unum gerentes, lemmate anguste elliptico, stam-

inibus 9–15(–18). Spiculae femineae flosculum unum gerentes, glumis glabris, costatis, anthecio longioribus.

Caespitose, perennial herb. Culms dimorphic. Sterile culms to 40 cm long, erect from decumbent bases; internodes hollow, terete, the basal ones short, the intermediate ones elongated, the apical ones shortened and hidden within the leaf complement; nodes vinaceous or stramineous, glabrous, linear to dilated and biannular, the lower usually geniculate. Fertile culms to 20 cm, basally decumbent, reduced and often flexuous, bearing bladeless sheaths, the sheaths basally imbricate, inflated and loose, stramineous or vinaceous-tinted. Leaves at lower and midculm nodes of sterile culms reduced to bladeless sheaths, often vinaceous-tinted, imbricate at culm bases but equaling to half as long as the internodes above. Upper leaves of sterile culms 7–10, forming a terminal complement with fully developed blades; sheaths truncate, dorsally keeled, hirtellous or glabrate, with 1–3 lunar marks at the summit; oral setae to 8 mm long, numerous, spreading, antrorsely scaberulous; ligules 0.6–0.7 mm long, truncate, scarious, usually obscured by oral setae and lateral callosities; pseudopetioles 1.5–2.5 mm long, glabrate, stramineous or vinaceous-tinted; blades 6.1–12.0 cm long, 0.8–1.1(–1.6) cm wide, linear or linear-lanceolate, basally cuneate, apically acuminate or setaceous, glabrous, conspicuously blue-white or silver glaucous below. Inflorescence to 4.4 cm long, ca. 1.0 cm wide, slender; spikelets in ca. 7 whorls, these overlapping up to ½ the length of the staminate pedicels of the whorl above; elaiosomes developed on the rachis segment at the base of the pedicels. Staminate spikelets 7.2–8.3(–10.3) mm long; pedicels 3.2–4.0 mm long, shorter than or occasionally subequal to the lemma, basally canescent, marginally ciliate; glumes 2.0–2.8 mm long, stiffly triangular, apically setaceous, 2–3-nerved, to ⅔ as long as the lemma, scaberulous or basally ciliate; lemmas 3.5–4.0(–6.0) mm long, narrowly elliptic, acuminate, glabrous; paleas subequal to the lemmas, often 4(–5)-nerved; lodicules 2, to 0.5 mm long, frontally directed at the palea margins, obovate; stamens 9–15(–18), the anthers 2.6–2.8 mm long, yellow, fully exerted at anthesis. Pistillate spikelets 5.3–6.1 mm long, sessile; glumes 5.3–6.1 mm long, subequal, overtopping the anthoecium by 0.6–1.1 mm, costate with faint marginal nerves occasionally evident, glabrous except scaberulous along the costa and apical margins; anthoecium 4.8–5.2 mm long, ovate, glabrous; lodicules 3, the anterior pair to 1.5 mm long, obovate, acute with apical microhairs, membranous, the posterior one to 0.5 mm long, elliptic, lacking apical microhairs;

style 1, short, glabrous; stigmas plumose, subapically exerted.

Paratypes. PANAMA. PANAMÁ: Cartí Road, 7 mi. from turnoff at El Llano, in forest along road, 9°15'N, 78°58'W, 320 m, occasional on slopes in forest, leaves glaucous below, 16–17 Apr. 1985, *Hammel 13546* (MO); El Llano–Cartí Road, 10 km from Inter-American Highway, forest grass, anthers yellow, 4 Oct. 1974, *Mori & Kallunki 2292* (MO); El Llano–Cartí Road, 6–7 mi. from Pan-American Highway, wet tropical forest, 300–350 ft., herb, leaves silvery below, inflorescence light green, stamens yellow, on a separate leafless scape, 28 Apr. 1981, *Sytsma 4151* (MO).

Pariana argentea is, as far as presently known, endemic to a small area on the Pacific slope of east-central Panama in the Province of Panamá, where it occurs in moist tropical forest.

Pariana argentea is distinguished by its narrow leaf blades with silvery, glaucous abaxial surfaces (the character from which the name is derived) and its decumbent, flexuous fertile culms. It is most closely related to *P. strigosa* Swallen and *P. gracilis* Doell. From the first it differs most notably in its smaller (6.1–12.0 × 0.8–1.1(–1.6) cm vs. 12.0–15.0 × 4.5–5.5 cm), linear to linear-lanceolate (not ovate to ovate-lanceolate) leaf blades, more numerous (not few or absent) and longer (to 8 mm vs. ca. 4 mm) oral setae, and pistillate glumes glabrous except for the scaberulous costae and apical margins (not puberulent and ciliate). It differs from *P. gracilis* in its glaucous (not green) lower leaf surfaces and more numerous stamens.

One collection (*Hammel 13546*) with the distinctive foliage of *P. argentea* has atypically large spikelets that resemble those of *P. simulans* Tutin and *P. strigosa*. These two larger species have puberulent pistillate glumes in contrast to the glabrous ones of *P. argentea*. This anomalous collection may also have lightly puberulent pistillate glumes, another intermediate spikelet feature, which suggests the possibility of hybridization and introgression among these three sympatric species. Of interest was the incidence of immature insects and insect damage within the florets of this anomalous collection.

Also notable is the differentiation of the rachis internode at the base of each spikelet whorl into a distinct callus. This callus is noticeably swollen in spikelet whorls containing mature pistillate spikelets, i.e., those bearing fully developed caryopses. Microscopic examination and staining with Sudan IV (a lipid-specific stain) of this callus in mature spikelet whorls of *Hammel 13546* showed that the swelling was caused by the accumulation of oil. Davidse (1987) has reviewed the occurrence of similar struc-

tures in other genera of grasses and has interpreted them as elaiosomes, which may be effective in ant dispersal. This interpretation also seems to apply to *P. argentea* and is probably also true of many other species in the genus.

BROMEAE

Bromus exaltatus Bernh., Linnaea 15(Litt. Ber.): 90. 1841. TYPE: Mexico. *Anonymous s.n.* (lectotype, selected here, MO-2957788).

In the only major revision of *Bromus* in Mexico and Central America, Soderstrom & Beaman (1968) neotypified *B. exaltatus* Bernh., the earliest name of section *Bromopsis* Dumort. (sect. *Pnigma* Dumort.) that applies to a Mesoamerican species. They assumed that the type specimen from the Bernhardt Herbarium (MO) was still missing, as both Wagnon (1950), on the authority of George B. Van Schaack, and Shear (1901), on the authority of W. Trelease, had reported. Although we do not know what may have happened to these specimens in the first part of this century (perhaps misfiled or not recognized as types), they were later found and annotated by Van Schaack. Two sheets, both representing the same species, exist. As is unfortunately characteristic of many specimens in the Bernhardt Herbarium, both are poorly labeled with minimal information. According to the annotation by Van Schaack, who interpreted the handwriting, one of the specimens, MO-2957788, has a label with "*Bromus exaltatus*, Mexico," in pencil in Bernhardt's own handwriting. The second specimen only bears an unpublished name. Since these are original specimens used by Bernhardt to write his description, the earlier neotypification is superseded and the first specimen is here chosen as the lectotype.

The lectotype has 3-nerved, pubescent glumes, pubescent lemmas 9.5–11.5 mm long, rounded on the back, auriculate sheaths, glabrous, obtuse ligules 0.8–1.1 mm long, a large nodding panicle, blades 7–9 mm wide, and anthers 2.7 mm long.

Both Wagnon (1950) and Soderstrom & Beaman (1968) commented on Bernhardt's description of the lower glume as 4-nerved. This was a simple mistake as all lower glumes in the lectotype are 3-nerved, with the lateral nerves weak in a few spikelets.

Since Soderstrom & Beaman (1968) greatly emphasized glume nervation as a key character, most specimens that we recognize as *B. exaltatus* would key out as *B. porteri* (J. Coulter) Nash in their treatment. However, *B. porteri* is a nonauriculate species of northern Mexico and the western United States, and we have not seen any specimens from Mesoamerica.

TRITICEAE

Agropyron attenuatum (Kunth) Roemer & Schultes is the most widespread native species of Triticeae in Latin America. It ranges along the main cordilleras from Costa Rica to Argentina.

We, like Löve (1984), place this species in the genus *Elymus* L. However, while transferring this species to *Elymus*, Löve (1984) inexplicably created an illegitimate later homonym while citing the legitimate earlier combination with this epithet. Thus, a new name is required for this species in *Elymus*.

Elymus cordilleranus Davidse & R. Pohl, nom. nov. Replaced name: *Elymus attenuatus* A. Löve, Feddes Repert. 95: 473. 1984, non (Griseb.) K. Richter, 1890, based on *Triticum attenuatum* Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 1: 180. 1816. *Agropyron attenuatum* (Kunth) Roemer & Schultes, Syst. Veg. 2: 751. 1817. TYPE: Ecuador. Propter Burropotrero et Chillo Quintensium, *Humboldt & Bonpland s.n.* (P).

ARUNDINEAE

Danthonia chiapasensis Davidse, sp. nov. TYPE: Mexico. Chiapas: steep slopes with montane rainforest, evergreen cloud forest and elfin forest, *Drimys*, *Quercus*, *Ostrya*, *Liquidambar*, *Styrax*, and *Ilex*, on the SE side of Cerro Tres Picos and the ridges near summit, elev. 2,100–2,500 m, 11 Dec. 1972, D. E. Breedlove & R. F. Thorne 30108 (holotype, DS).

Gramen perenne caespitosa. Culmi 40–60 cm longi. Folia laminis 20–45 cm longis, plerumque involutis sed ad 5 mm latis ubi complanatis. Panicula 8–13 cm longa, ca. 1.5 cm lata, ramis glabris. Spiculae 17–21 mm longae; flosculis 5–6; lemmate infimo usque ad aristae centralis insertionem 4.0–4.5 mm longo, 9-nervi, dorsaliter pilosa in dimidio inferiore, dentibus lateralibus 8.0–9.5 mm longis aristam includentibus, aristis centralibus ad 25 mm longis, callo piloso trichomatibus 0.5–1.0 mm longis. Caryopsis non suppetens.

Densely caespitose, perennial herb; innovations intravaginal. Culms 40–60 cm long, erect, glabrous. Leaves basal and cauline; sheaths rounded on the back, glabrous except for tufts of hairs 0.7–1.1 mm long in the auricular area; ligule a dense row of hairs 0.5–1.5 mm long; blades 20–45 cm long, mostly involute, to 5 mm wide when flat, glabrous to sparsely pilose toward the base above and below, the upper surface deeply and closely furrowed. Panicle 8–13 cm long, ca. 1.5 cm wide, linear; branches to 7 cm long, ascending, glabrous. Spikelets 17–21 mm long; glumes subequal, as long as the spikelet,

lanceolate, long-acuminate, 3–5-nerved, purplish in the center, translucent whitish toward the margins; florets 5–6, smaller upwards, the uppermost rudimentary; lowermost lemma 4.0–4.5 mm to the point of insertion of the central awn, 9-nerved, pilose on the back and along the margins in the lower half, the lateral teeth prominent, awned, 8.0–9.5 mm long including the awn, the central awn to 25 mm long, the basal part flattened and twisted; lowermost palea ca. 6 mm long, prominently 2-keeled, acute, sulcate between the scaberulous keels; callus linear, pilose with hairs 0.5–1.0 mm; lodicules 2, obovate, obtuse, vasculated, sparsely ciliate with hairs to 0.5 mm long; stamens 3, the anthers 1.7–3.4 mm; styles 2, separate, the stigmas plumose; caryopsis not available.

This species is only known from the type locality in the Sierra Madre in the State of Chiapas (after which it is named), at ca. 16°12'N, 93°37'W.

Only one other native species of *Danthonia* DC. is known from Mesoamerica, *D. filifolia* Hubb., which ranges from Puebla, Mexico, to Guatemala. *Danthonia chiapasensis* is easily distinguished from that species by the lemma, which is prominently long-pilose on the back (vs. glabrous), and the short-pilose callus (0.5–1.0-mm vs. 3–5-mm-long hairs).

Although it may not necessarily be particularly closely related to either, it is morphologically most similar to *D. parryi* Scribner from the Rocky Mountains in the north, and *D. cirrata* Hackel & Arechav. from southern Brazil, Uruguay, and Argentina in the south.

Danthonia parryi differs from *D. chiapasensis* in its larger spikelets, smaller inflorescences, puberulent panicle branches, broader and less prominently nerved glumes and lemmas, and broader calluses. *Danthonia cirrata* differs in its narrower leaf blades, florets smaller in all parts, and denser lemma pubescence.

Conert (1987) has pointed out that *Danthonia* (sens. lat.) in the New World has a large gap in its distributional range in that seven species occur primarily in the United States and 18 species in southern South America. In the north only *D. spicata* (L.) P. Beauv., primarily of the United States, ranges as far south as Puebla, Mexico, but it becomes quite rare in the southernmost part of its range. In the south the widely ranging *D. secundiflora* J. S. Presl reaches as far north as Colombia. *Danthonia chiapasensis* and *D. filifolia* partially bridge the gap along the probable Cordilleran migration route for the genus. Interestingly, they each represent one of the major morphological groups of *Danthonia* (sens. str.) in the Americas, i.e., those with lemmas long-

pilose all over the back, and those ciliate only along the margins.

ERAGROSTIDEAE: ELEUSININAE

Eragrostis rufescens Schrader ex Schultes var. ***mesoamericana*** Davidse, var. nov. TYPE: Honduras. Morazán: 2.5 km N of Zambrano on road to San Francisco de Soroguara, pine forest along a small stream, on dry tuff outcrops, elev. 1,370 m, 1 July 1970, *R. W. Pohl & G. Davidse 12125* (holotype, MO; isotype, ISC).

A var. *rufescens* inflorescentiis ramorum axillis pilosis et pedicellis divergentibus differt.

Caespitose, eglandular, annual herb. Culms 5–35 cm tall, erect to decumbent, usually unbranched, glabrous. Leaves mostly basal; sheaths rounded, glabrous to papillose-pilose, the apex pilose; ligule 0.1–0.2 mm long, a row of hairs; blades 5–20 cm long, 2.0–4.5 mm wide, flat to rolled, papillose-pilose to glabrous. Panicle 2–13 cm long, 1.5–6 cm wide, ellipsoid to ovoid, moderately dense; axils densely pilose, rarely sparsely pilose or nearly glabrous; branches spikelet-bearing to the base; pedicels much shorter than the spikelets, slightly divergent. Spikelets 8–15 mm long, 1.6–2.3 mm wide, oblong to oblong-lanceolate, purplish, disarticulating from the base; glumes 1-nerved, acute, the lower 1–2 mm long, the upper 1.2–1.8 mm long; rachilla persistent; florets 13–45; lemmas 1.4–2.1 mm long, acute, sharply keeled, scaberulous on the keels, overlapping for $\frac{1}{2}$ – $\frac{3}{4}$ of their length, the lateral nerves evident; paleas $\frac{3}{4}$ to nearly as long as the lemmas, the keels ciliolate; stamens 2, the anthers 0.2–0.3 mm, purple. Caryopsis 0.4–0.5 mm long, 0.3 mm wide, ovate in outline, roundly triangular in cross section, apically obtuse.

Paratypes. MEXICO. VERACRUZ: Coatzacoalcos, 21 Mar. 1910, *Orcutt 3103* (MO). TABASCO: Mun. Huimanguillo, Laguna de los Limones, 18 Nov. 1981, *Magaña & Zamudio 111* (MO). CHIAPAS: Mun. La Trinitaria, 9 km S of Comitán, 6 Nov. 1981, *Breedlove & Davidse 54951* (CAS, MO); Mun. La Trinitaria, 10 km E of La Trinitaria, 7 Nov. 1981, *Breedlove & Davidse 54977* (CAS, MO). BELIZE. BELIZE: mi. 7 on Northern Highway, 23 Jan. 1974, *Dwyer & Liesner 12147* (MO); from Belize City to 5 mi. beyond Ladyville Estates, 22 Mar. 1973, *Dwyer 10403* (MEXU, MO); Sibun River, 25 Feb. 1936, *Gentle 1812* (MO); Belize, 29 Jan. 1931, *Bartlett 11257* (MO). CAYO: road S to Augustine and San Luis to Camp Six, 19 Mar. 1967, *Dwyer et al. 300* (MO). ORANGE WALK: 5 km N of August Pine Ridge, 19 Mar. 1987, *Davidse & Brant 32778* (MO). TOLEDO: lower part of Richardson Creek, 2–3, 11 Mar. 1987, *Davidse & Brant 32326* (MO). GUATEMALA. CHIQUIMULA: 10 km ESE of Esquipulas, 12 Aug. 1970, *Harmon & Dwyer 3746* (MO).

HONDURAS. COLÓN: 4.5 mi. NE of Trujillo, 28 Jan. 1981, *Saunders 959* (MO). COMAYAGUA: Siguatepeque, 26 May 1972, *Burch 6144* (MO). EL PARAÍSO: road to Yuscarán, 21 Dec. 1975, *Williams et al. 31196* (MO); 2 mi. W of Güinope, 5 Jan. 1947, *Williams & Molina R. 11518* (MO); 3 km NW of Güinope, 27 Feb. 1949, *Williams & Merrill 15704* (MO); 25 km W of Danlí, 20 July 1971, *Pohl 12612* (MO). GRACIAS A DIOS: Ahuas, 12–14 dic. 1972, *Clewell 3606* (MEXU, MO). LEMPIRA: cerca la ciudad de Gracias, 7–9 dic. 1971, *Nelson et al. 176* (MO). FRANCISCO MORAZÁN: 8 km E of El Zamorano, 14 June 1970, *Pohl & Davidse 11911* (MO); El Zamorano, 2 Nov. 1981, *Swallen 11266* (MO); 14 km NW of Lepaterique, 2 Jan. 1979, *Pohl & Gabel 13865* (MO); 4 km SE of Río Agua Caliente, 1 Jan. 1979, *Pohl & Gabel 13848* (MO). OCOTEPEQUE: 8 km SW of Santa Fé, 16 Jan. 1976, *Williams et al. 31263* (MO). OLANCHO: 11 km NE of Pataste, 23 Dec. 1978, *Pohl & Gabel 13779* (MO). NICARAGUA. COMARCO DEL CABO: near Bilwaskarma, 12 Mar. 1971, *Seymour 4579* (MO). ZELAYA: junction of road to Alamikanba with road between El Empalme and Limbaika, 24 Feb. 1979, *Stevens 12780* (MO). COSTA RICA. GUANACASTE: 5 km S of Liberia, 5 Dec. 1968, *Pohl & Davidse 11553* (MO). SAN JOSÉ: vic. of El General, Dec. 1936, *Skutch 3068* (MO).

This variety has been collected in *Trachypogon* savannas, open areas in *Pinus* forests, and in *Pinus* savannas at 0–1,600 m elevation from Oaxaca, Mexico, to Costa Rica.

This distinctive suite of specimens from Oaxaca and Veracruz to Costa Rica has an acute lemma apex. They have almost invariably been identified as *E. maypurensis* (Kunth) Steudel, a widespread species ranging from Durango, Mexico, to Brazil and Bolivia. However, true *E. maypurensis* has an acuminate, somewhat divergent lemma apex. These Mesoamerican specimens agree well in general morphology and spikelet characters with *E. rufescens*, a South American species, previously unreported from Mesoamerica. The Mesoamerican plants differ somewhat from the South American plants in having the main axils of the inflorescence branches usually densely pilose (rarely sparsely pilose or nearly glabrous) versus glabrous or sparsely pilose and in having the spikelets more divergent from the inflorescence branches versus virtually appressed in typical *E. rufescens*. For these reasons the Mesoamerican plants are recognized as a new variety. The epithet reflects its Mesoamerican distribution.

CYNODONTEAE: BOUTELOUINAE

Chondrosum Desv. has most recently been recognized by Clayton (1982) and Clayton & Renvoize (1986). The species included have usually been placed in *Bouteloua* Lagasca (e.g., Griffiths, 1912; Gould, 1980a), from which they differ in having usually fewer pectinate spikes whose spikelets disarticulate above the glumes. Species retained in *Bou-*

teloua usually have numerous spikes that disarticulate as a unit from the rachis. The recognition of both genera for *Flora Mesoamericana* requires one new combination.

Chondrosum hirsutum (Lagasca) Sweet, Hort. Brit. 455. 1827. *Bouteloua hirsuta* Lagasca, Varied. Ci. 2: 141. 1805. TYPE: Cult. Madrid Bot. Gard., *Lagasca s.n.* (lectotype, selected by Gould (1979), MA).

Chondrosium hirtum Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 1: 176. 1816. TYPE: Crescit in temperatis, apricis Novae Hispaniae, inter Mexico et Gasave, alt. 1180 hex., *Humboldt & Bonpland s.n.* (P).

The treatment in Sweet consists only of the statement, “4. *hirsutum* Hairy.” This appears to be a very deficient description, but Sweet referred in his naming of the genus to “K.S.” This cryptic reference appears to be Kurt Sprengel’s sixteenth edition of *Systema Vegetabilium*. Page 293 of this work contains a portion of Sprengel’s treatment of *Atheropogon* Muhlenb., a synonym of *Bouteloua*. Number 3 of Sprengel’s listing is *A. hirtus*, indicated by him as a reference to *Chondrosium hirtum* Kunth (1816) or the earlier *Bouteloua hirsuta* Lagasca (1805).

Chondrosum hirsutum (Lagasca) Sweet var. ***glandulosum*** (Cerv.) R. Pohl, comb. nov. Basionym: *Erucaria glandulosa* Cerv., Naturaleza (Mexico City) 1: 347. 1870. TYPE: Mexico. In collibus de Guadalupe, et de Moctezuma prope Mexicum.

ERAGROSTIDEAE: SPOROBOLINAE

Pereilema diandrum R. Pohl, sp. nov. TYPE: Costa Rica. Heredia: Puente Mulas, S of San Antonio, canyon of Río Virilla, 850 m, 28 Nov. 1968, *R. W. Pohl & G. Davidse 11482* (holotype, ISC, fragment, MO; isotype, US).

Gramen annuum caespitosum a *P. beyrichiano* (Kunth) A. Hitchc. panicula densiore ramis ascendentibus superpositis, arista lemmatis 10–24 mm longa, antheris duabus et chromosomatum numero $2n = 80$ recedit.

Caespitose, annual herb. Culms 40–80 cm long, sometimes decumbent and rooting from lower nodes, usually simple; internodes 1–2 mm diam., slightly scabrid, often reddish; nodes glabrous. Leaves with the sheaths shorter than the internodes, scabrid; prophylls prominent, 2–3 cm long, bifid; ligule a thick membrane 0.7–1 mm long; blades 10–20 cm long, 5–8 mm wide, scabrid; auricles prominent, clasping, ciliate. Panicle solitary, terminal on the

main culm or leafy branches, 10–20 cm long, 1–2 cm wide, cylindrical; peduncle included or exerted to 6 cm; rachis angular, ciliate-scabrous; branches ascending, overlapping, solitary, 1–3 cm long, densely covered with dense fascicles of spikelets. Sterile spikelets reduced to bristles 3–5 mm long; functional spikelets terete; glumes subequal, 0.7–1.5 mm long, oblong to broadly ovate, 1-nerved, with an awn 1.5–4 mm long; lemma 1.9–2.5 mm long, 3-nerved, scabrid, with a straight awn 10–24 mm long; callus hairs 0.6–0.8 mm, scant; palea bidentate, slightly longer than the lemma; stamens 2, the anthers 0.8–1.0 mm long, often purple. $2n = 80$ from type.

Representative paratypes. COSTA RICA. SAN JOSÉ: Río Tiliri, *Tonduz* 3121 (ISC); San Francisco de Guadalupe, *Tonduz* 9817 (ISC, US); Llano Grande de Puriscal, *Jiménez* 890 (US). ALAJUELA: Carrillos de Poás, *Brenes* 14606 (US). Numerous other specimens from the San José area are in US.

This species is only known from the Meseta Central and Cantón de Dota, Costa Rica, at elevations of 500–1,200 m.

This species is similar to *P. beyrichianum* (Kunth) A. Hitchc. (syn. *P. brasilianum* Trin.) of South America, differing in the denser panicle with ascending appressed branches, longer lemma awn, possession of 2 anthers (basis of the epithet) rather than 3, and in the octoploid chromosome number, $n = 40$. The chromosome number of *P. diandrum* was determined from the type but was mistakenly reported under the name *P. beyrichianum* (Pohl & Davidse, 1971). The only known count for true *P. beyrichianum* is $n = 20$ (Davidse & Pohl, 1978, as *P. brasilianum* Trin.). It differs from Mesoamerican *P. crinitum* J. S. Presl in its straight rather than flexuous awn, broader leaf blades, and in chromosome number. The chromosome number for *P. crinitum* has been reported as $n = 10$ (Gould & Soderstrom, 1970; Pohl & Davidse, 1971; Davidse & Pohl, 1974; Reeder, 1984).

PANICEAE: SETARIINAE

Panicum aquaticum* Poiret var. *cartagoense Davidse, var. nov. TYPE: Costa Rica. Cartago: 0.5 km E of Planta Radiográfica along railroad, 2 km W of Paraíso, 1,300 m, open grass marsh, plants 1–2 m tall, rooted in dense tangle of herbage, chromosome number determined to be $n = 36$, 6 Feb. 1969, *R. W. Pohl & G. Davidse* 11700 (holotype, ISC).

A var. *aquaticum* culmis longioribus simplicibus foliorum vaginis pubescentibus paniculis grandioribus et foliorum laminis erectis differt.

Perennial, rhizomatous herb. Culms 1–2 m long, erect, unbranched; internodes and nodes glabrous. Leaves with sheaths papillose-pubescent to glabrescent; ligule with the membrane 0.4–0.6 mm long and the cilia 0.7–1.0 mm long; blades to 35 cm long, 7–10 mm wide, sparingly pilose. Panicle ca. 27 cm long, terminal; branches 10–14 cm long, scaberulous. Spikelets 3.0–3.1 mm long, basally in unequal pedicellate pairs, terminally solitary, lanceoloid-ellipsoid, glabrous; lower glume 0.8–1.0 mm long, $\frac{1}{5}$ – $\frac{3}{10}$ as long as the spikelet, 1-nerved, obtuse; upper glume as long as the lower lemma, 7-nerved, acute; lower floret staminate; lower lemma as long as the spikelet, 7–9-nerved, acute; lower palea as long as the lower lemma; stamens 3, the anthers 0.7–1.4 mm long; upper floret 1.9–2.0 mm long, 0.9–1.0 mm wide, smooth and shiny, glabrous, acute; stamens 3, the anthers 1.3–1.4 mm long.

This distinctive middle-elevation population is only known from the type collection. It is perennial, has spikelets like *P. aquaticum*, but differs from the typical variety of the species by its much larger stature, unbranched culms, pubescent leaf sheaths, larger panicles, and upright leaf blades.

Panicum sect. *Dichotomiflora* A. Hitchc. & Chase ex Honda contains a widespread, annual-perennial species pair (*P. dichotomiflorum* Michaux–*P. aquaticum*) that has often been treated as a single species (e.g., Reeder & Reeder, 1971; Renvoize, 1984). We recognize the two taxa at the species level because of the difference in life form and because *P. aquaticum* has a functional male flower in the lower floret. This male flower is lacking in *P. dichotomiflorum*, even in plants in which the lower palea is fully developed. As Hitchcock & Chase (1910) noted many years ago, the lower palea of *P. dichotomiflorum* may be completely absent to fully developed.

The new variety seems to have a relationship with *P. aquaticum* var. *aquaticum* equivalent to that of *P. dichotomiflorum* var. *bartowense* (Scribner & Merr.) Fern. with variety *dichotomiflorum*, with the outstanding differences of both of the nontypical varieties being the unbranched culms and pubescent sheaths.

Variety *cartagoense* is an octoploid with $n = 36$, as is variety *aquaticum* (Davidse & Pohl, 1974, reported as *P. aquaticum*). The varietal name is based on the name of the province in which it was collected.

The recognition of *Dichanthelium* (A. Hitchc. & Chase) Gould as a segregate genus from *Panicum* L. continues to be controversial. Nevertheless, it seems likely that, despite a relatively uniform spikelet structure, *Panicum* as recognized in the broad

sense by Zuloaga (1987) and Clayton & Renvoize (1986) is polyphyletic, since elements included in *Panicum* sens. lat. are probably more closely related to other segregate genera now generally recognized. Under these circumstances narrow generic concepts seem prudent. Most of the combinations for Mesoamerican species of *Dichanthelium* are already available from the work of Hansen & Wunderlin (1988), Gould (1974, 1980b), and Gould & Clark (1978). The few additional ones not yet available are made here:

Dichanthelium sphaerocarpon (Elliott) Gould var. ***floridanum*** (Vasey) Davidse, comb. nov. Basionym: *Panicum sphaerocarpon* Elliott var. *floridanum* Vasey, U.S.D.A. Div. Bot. Bull. 8: 33. 1889. *P. erectifolium* Nash, Bull. Torrey Bot. Club 23: 148. 1896, nom. nov. for *P. floridanum* (Vasey) Chapman, Fl. South. U.S. (ed. 3) 585. 1897, non Trin. 1835. *Dichanthelium erectifolium* (Nash) Gould & C. A. Clark, Ann. Missouri Bot. Gard. 65: 1105. 1979. TYPE: United States. Florida: Mosquito Inlet, moist pine barrens, 5 May 1879, *Curtiss* 3599 (lectotype, selected by Hitchcock & Chase (1910), US; isoelectotype, MO).

Dichanthelium erectifolium was distinguished from *D. sphaerocarpon* by Gould & Clark (1978), following Hitchcock & Chase (1910), by its smaller spikelets (1.0–1.1 vs. 1.4–2.0 mm long). Hitchcock & Chase (1910) additionally noted differences in growth habit, blade nervation, and panicle size. However, reexamination of specimens throughout the range (including *D. sphaerocarpon* var. *isophyllum* (Scribner) Gould & C. A. Clark, *P. polyanthes* Schultes) shows a complete intergradation in habit, inflorescence size, and spikelet size. However, plants traditionally referred to *D. erectifolium* have modally smaller spikelets, 1.2 versus 1.5 mm, suggesting that varietal status is appropriate. As suggested by the specific epithet, the leaves of variety *floridanum* tend to be erect and appressed to the culm, and they also have a more clearly defined ligule, a ciliate rim 0.3–0.4 mm long. The characters that distinguish variety *floridanum* are nearly equivalent to those that distinguish variety *isophyllum* from variety *sphaerocarpon*, as was done by Gould & Clark (1978).

Dichanthelium sciurotoides (Zuloaga & Morrone) Davidse, comb. nov. Basionym: *Panicum sciurotoides* Zuloaga & Morrone, Novon 1: 1. 1991. TYPE: Brazil. Minas Gerais: Distrito Diamantina, Christais, near Corrigan Duas Pon-

tes, on damp earth in shade, common, 1,160 m, 13 May 1931, *Mexía* 5819 (holotype, MO; isotypes, G, K, M, P, R).

Dichanthelium sciurotis (Trin.) Davidse, comb. nov. *Panicum sciurotis* Trin., Gram. Panic. 228. 1826. TYPE: Brazil. *Chamisso* s.n. (holotype, LE).

Zuloaga & Morrone (1991) recently clarified the status of the above two species. Mesoamerican plants of *D. sciurotoides* have previously been misidentified as *D. viscidellum* (Scribner) Gould and as *Dichanthelium sciurotis* Trin. The latter is a rare, narrowly restricted species from northeastern Brazil (Zuloaga & Morrone, 1991). *Dichanthelium sciurotoides* is so far known only from Belize, Bolivia, Brazil, Ecuador, French Guiana, Guyana, Panama, and Venezuela. *Dichanthelium viscidellum* ranges from southern Mexico throughout Mesoamerica to Colombia and Venezuela. The three species may be distinguished as follows:

- 1a. Lower glume nerveless, truncate; lower lemma inflated at the base *D. sciurotis*
- 1b. Lower glume 1–3(–7)-nerved, acute to sub-acute.
 - 2a. Ligule with the membrane always longer than the minute cilia; spikelets glabrous *D. sciurotoides*
 - 2b. Ligule with the cilia always longer than the minute rudimentary membrane; spikelets usually at least sparsely, marginally puberulent, rarely glabrous, often densely puberulent *D. viscidellum*

Dichanthelium aciculare (Desv. ex Poiret) Gould & C. A. Clark var. ***ramosum*** (Griseb.) Davidse, comb. nov. Basionym: *Panicum neuranthum* Griseb. var. *ramosum* Griseb., Cat. Pl. Cub. 232. 1866. TYPE: Cuba occ., *Wright* 3454 (holotype, GOET).

The element of *D. aciculare* traditionally known as *Panicum fusiforme* A. Hitchc. (Hitchcock & Chase, 1910), which has large, acute spikelets with a long-attenuate base, seems modally distinct from the rest of the species, especially in Mesoamerica, although there is some intergradation. This kind of variation is best recognized at the varietal rank.

Dichanthelium dichotomum (L.) Gould var. ***unciphyllum*** (Trin.) Davidse, comb. nov. Basionym: *Panicum unciphyllum* Trin., Gram. Panic. 242. 1826, and the autonym created by *P. unciphyllum* Trin. var. *implicatum* (Scribner) Scribner & Merr., Rhodora 3: 123. 1901. TYPE: United States. *Trattinick* s.n.

(lectotype, selected by Hitchcock & Chase (1910), LE).

Panicum tenue Muhlenb., Descr. Gram. 118. 1817. *Dichanthelium dichotomum* (L.) Gould var. *tenue* (Muhlenb.) Gould & C. A. Clark, Ann. Missouri Bot. Gard. 65: 1119. 1979. TYPE: United States. *Muhlenberg Herb.* 192 (holotype, PH-M, fragment, US).

As pointed out by Hansen & Wunderlin (1988), *unciphyllum* is an earlier varietal epithet. Although they include this variety in *Dichanthelium ensifolium* (Baldwin ex Elliott) Gould, I agree with Gould & Clark (1978) that because of more numerous elongated culm internodes, it is best considered a part of *D. dichotomum*.

Dichanthelium umbonulatum (Swallen) Davidse, comb. nov. Basionym: *Panicum umbonulatum* Swallen, Contr. U.S. Natl. Herb. 29: 420. 1950. TYPE: Guatemala. Zacapa: upper slopes of Sierra de Las Minas, along Río Repollal, 2,100–2,400 m, 12–13 Jan. 1942, *Steyermark* 42469 (holotype, US; isotype, F).

Panicum ramiparum Swallen, Contr. U.S. Natl. Herb. 29: 423. 1950, syn. nov. TYPE: Guatemala. Quetzaltenango: mountains near Santa María, S of Quetzaltenango, 25 Mar. 1932, *Weatherwax* 160 (holotype, US).

Panicum alcobense Swallen, Contr. U.S. Natl. Herb. 29: 423. 1950, syn. nov. TYPE: Guatemala. Jalapa: oak wood around top of Cerro Alcoba, just E of Jalapa, 1,700 m, 2 Dec. 1939, *Steyermark* 32515 (holotype, US; isotype, F).

Panicum alsophilum Swallen, Contr. U.S. Natl. Herb. 29: 422. 1950, syn. nov. TYPE: Guatemala. Jalapa: in oak woods around the top of Cerro Alcoba, just E of Jalapa, 1,700 m, 2 Dec. 1939, *Steyermark* 32513 (holotype, F).

Dichanthelium umbonulatum is closely related to *D. commutatum* (Schultes) Gould sens. lat., including *D. albomaculatum* (Scribner) Gould, syn. nov., but differs in its glabrous spikelets and leaves with a prominent line of hairs at the base of the blade near the throat of the sheath; it also tends to have smaller leaf blades. The tip of the upper lemma is umbonate with a distinct, nearly herbaceous, protuberance. This is also true in *D. commutatum* in Mexico, Mesoamerica, and the southern United States but gradually becomes less pronounced northward in the United States. *Panicum ramiparum* is a form of *D. umbonulatum* with broad, pubescent leaves, and *P. alcobense* is a form with slightly smaller leaf blades. Although Swallen (1950) also noted that *P. alcobense* has the upper glume and lower lemma shorter than the upper floret, *D. umbonulatum* is variable in this regard and this character is not useful for separating these taxa. Finally,

Panicum alsophilum is a form with the spikelets less densely arranged in the panicle.

Dichanthelium cordovense (Fourn.) Davidse, comb. nov. Basionym: *Panicum cordovense* Fourn., Mexic. Pl. 2: 26. 1886. TYPE: Mexico. Cordova, *Schaffner* 293 (holotype, P, fragments, BAA, US).

Dichanthelium pantrichum (Hackel) Davidse, comb. nov. Basionym: *Panicum pantrichum* Hackel, Verh. K.K. Zool.-Bot. Ges. Wien 65: 72. 1915. TYPE: Brazil. Rio Grande do Sul: Mun. Rio Pardo, Fazenda Leitão, 70 m, Feb. 1909, *Jürgens s.n.* (holotype, W, fragment, US).

Typical species of *Setaria* P. Beauv. are well characterized by the possession of dense, cylindrical panicles with the spikelets borne in disordered fascicles on the main rachis or on the primary branches and flat, nonplicate leaf blades. In the majority of cases, each spikelet is subtended by one to several sterile branches or bristles. Another group of species has but a single bristle borne below the terminal spikelet of each branch. Such species were assigned by Hitchcock & Chase (1910) to *Panicum* subg. *Paurochaetium* A. Hitchc. & Chase and more recently by Pilger (1940: 72) to *Setaria* sect. *Paurochaetium* (A. Hitchc. & Chase) Pilger. Rominger (1962) noted that these species do not constitute a natural group, and his observation is substantiated by the anomalous structure of the inflorescence and spikelets in *S. chapmanii* (Vasey) Pilger. In this species, the slender inflorescence is made up of a number of unilateral spikes. The spikelets are biseriate and turned with the blunt first glume turned away from the rachis and the back of the fertile lemma toward it. The end of the rachis of the spike is a triquetrous extension beyond the terminal spikelet. This has led to the inclusion of this species in *Setaria* sect. *Paurochaetium*, but the neat arrangement of the spikelets in unilateral spikes is highly anomalous in that genus. The nature of the inflorescence indicates that this species is better accommodated in *Paspalidium* Stapf, characterized by spikelets borne in unilateral spikes and oriented with the back of the upper lemma turned regularly toward the rachis. *Paspalidium* with about 30 species is pantropical with its greatest center of speciation in Australia. The other Mesoamerican species of *Paspalidium*, *P. geminatum* (Forsskal) Stapf, is aquatic and has thick, spongy culms, while *P. chapmanii* is an inhabitant of more temporary pools and marshes on limestone, coral, and sand, with more slender culms.

As already noted by Rominger (1962), the remaining species in subgenus *Paurochaetium* fall into a primarily West Indian–Floridian group of six species, and a mainland group of three species centered in Texas and northern Mexico, with a fourth species from the Yucatan Peninsula. Although the arrangement of the spikelets in the West Indian species is less neat than in *P. chapmanii*, it nevertheless corresponds quite closely to the type of inflorescence structure found in certain Australian species of *Paspalidium*, such as *P. clementii* (Domin) C. E. Hubb., *P. constrictum* (Domin) C. E. Hubb., *P. criniforme* S. T. Blake, and *P. grandispiculatum* B. Simon. For this reason we take the opportunity here to transfer these species to *Paspalidium*. This relationship was also hinted at by Clayton & Renvoize (1986). We prefer to maintain the mainland group in *Setaria*.

Paspalidium chapmanii (Vasey) R. Pohl, comb. nov. Basionym: *Panicum chapmanii* Vasey, Bull. Torrey Bot. Club 11: 61. 1884, as *P. "chapmani."* *Setaria chapmanii* (Vasey) Pilger, Nat. Pflanzenfam. (ed. 2) 14e: 72. 1940. TYPE: United States. Florida: *Chapman s.n.* (lectotype, selected by Hitchcock & Chase (1910), US).

Paspalidium distantiflorum (A. Rich.) Davidse & R. Pohl, comb. nov. Basionym: *Panicum distantiflorum* A. Rich. in Sagra, Hist. Fis. Cuba, Bot. 11: 302. 1850. *Setaria distantiflora* (A. Rich.) Pilger, Nat. Pflanzenfam. (ed. 2) 14e: 72. 1940. TYPE: In montosis insulae Cubae, *Sagra s.n.* (holotype, P).

Paspalidium leonis (E. Ekman) Davidse & R. Pohl, comb. nov. Basionym: *Panicum leonis* E. Ekman in A. Hitchc., Man. Grasses W. Ind. 295. 1936. TYPE: Cuba. Cojimar, near Habana, in fruticetis littoralibus, 9 Sep. 1921, *Ekman 13155* (holotype, US).

Paspalidium ophiticola (A. Hitchc. & E. Ekman) Davidse & R. Pohl, comb. nov. Basionym: *Panicum ophiticola* A. Hitchc. & E. Ekman in A. Hitchc., Man. Grasses W. Ind. 293. 1936. *Setaria ophiticola* (A. Hitchc. & E. Ekman) Sauget-Barb., Contr. Ocas. Mus. Hist. Nat. Colegio "De La Salle" 8: 163. 1946. TYPE: Cuba. Pinar del Río: Loma Cajalbana, in cuables, on serpentine, 2 Jan. 1921, *Ekman 12712* (holotype, US).

Paspalidium pradanum (Sauget-Barb.) Davidse & R. Pohl, comb. nov. Basionym: *Panicum pradanum* Sauget-Barb. in A. Hitchc., Man. Grasses W. Ind. 294. 1936. *Setaria pradana* (Sauget-Barb.) Sauget-Barb., Contr. Ocas. Mus.

Hist. Nat. Colegio "De La Salle" 8: 164. 1946. TYPE: Cuba. Oriente: in open thickets on slope of Mesa de Prada, lower Jauco Valley, Jauco, 17 July–4 Aug. 1924, *Léon 11710* (holotype, US).

Paspalidium subtransiens (A. Hitchc. & E. Ekman) Davidse & R. Pohl, comb. nov. Basionym: *Setaria subtransiens* A. Hitchc. & E. Ekman in A. Hitchc., Man. Grasses W. Ind. 351. 1936. TYPE: Cuba. Santa Clara: in thickets on serpentine, Motembo, 27 June 1923, *Ekman 16828* (holotype, US).

Paspalidium utowanaeum (Scribner) Davidse & R. Pohl, comb. nov. Basionym: *Panicum utowanaeum* Scribner, Publ. Field Columbian Mus., Bot. Ser. 2: 25. 1900. *Setaria utowanaea* (Scribner) Pilger, Nat. Pflanzenfam. (ed. 2) 14e: 72. 1940. TYPE: Puerto Rico. From a dry hillside near Guánica, 22 Jan. 1899, *Mills-paugh 702* (holotype, F).

PANICEAE: DIGITARIINAE

Digitaria breedlovei R. Pohl & Davidse, sp. nov. TYPE: Mexico. Chiapas: Municipio de Villa Corzo, 65 km S of Mexican Highway 190 on road from Tuxtla Gutiérrez to Nueva Concordia, steep canyon with seasonal evergreen forest and slopes of *Quercus*, elev. 850 m, 12 Sep. 1974, *D. E. Breedlove 37709* (holotype, MO; isotypes, CAS, MEXU). Figure 8.

Digitaria spiculis ternatis gluma prima absenti, gluma secunda obsoleta vel minuta, usque ad 0.4 mm longa, lemmate fertili brunneolo vel castaneo, rhachidi triquetra, hirsuta.

Caespitose, annual herb. Culms 25–50 cm long, branching from the base; internodes glabrous. Leaves with the sheaths and blades densely papillose-hirsute; ligule 0.7–1 mm long, membranous, truncate; blades 4–10 cm long, 2–3 mm wide, linear, flat. Inflorescences 6–12 cm long, terminal; peduncles exerted for 6–8 cm; rachis of the inflorescence short; racemes 4–5, 6–8 cm long, slender, ascending; rachis of the racemes 0.2–0.3 mm wide, triquetrous, bearing conspicuous hairs 1–2 mm long; pedicels scabrous, unequal, the longest 1.3–1.5 mm long. Spikelets 1.3–1.5 mm long, in triads, acute; lower glume absent; upper glume 0–0.4 mm long, a hyaline scale when present; lower lemma narrower and shorter than the upper, 5-nerved, sparsely appressed-pubescent, the hairs with dilated tips; upper lemma tan to light brown, minutely striate; stamens 3, the anthers ca. 0.5 mm; pollen and caryopses developing.

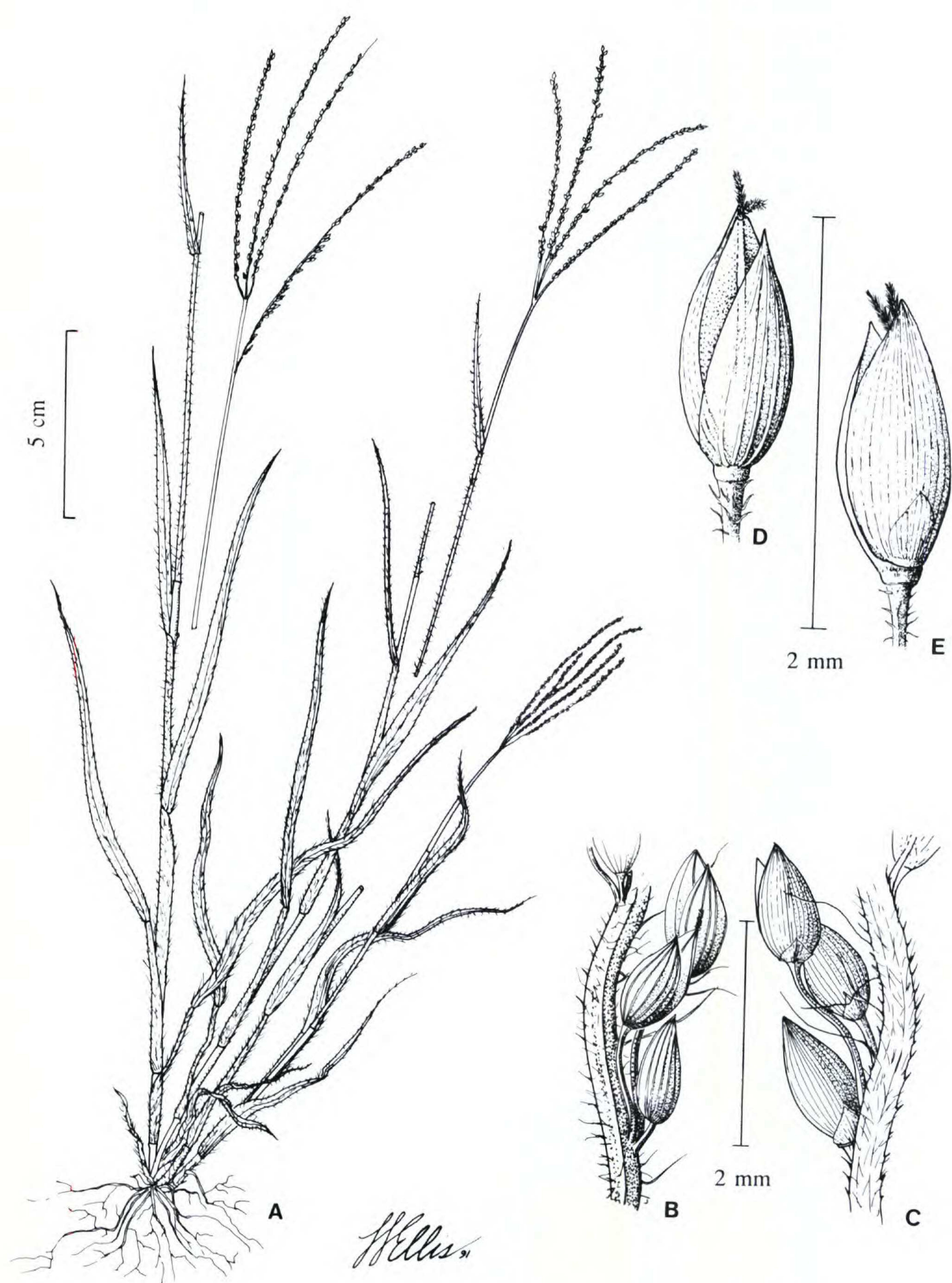


Figure 8. *Digitaria breedlovei* R. Pohl & Davidse. —A. Habit. —B, C. Two views of a rachis segment with a spikelet triad. D, E. Spikelet. —D. Ventral view showing upper lemma. —E. Dorsal view showing small hyaline lower upper glume and back of upper floret. (Based on *Breedlove* 37709.)

This species is known only from the type collection. It is distinguishable from other American species with ternate spikelets by the minute, hyaline upper glume and the conspicuously hirsute rachis.

This species is named in honor of Dennis E. Breedlove, California Academy of Science, in recognition of his outstanding contributions to Mexican botany, especially his work on the *Flora of Chiapas*.

Digitaria clavitricha R. Pohl, sp. nov. TYPE: Panama. Colón: Chorrera, prairie, especially on dry or gravelly places, 16 Sep. 1911, *A. S. Hitchcock*, *Amer. Grasses Natl. Herb.* 1564 (holotype, MO; isotype, US) [also distributed as *A. S. Hitchcock* 8149 (US)].

Digitaria ad sectionem *Corynotrichas* Henrard pertinens. Gramen perenne. Inflorescencia ex racemis 1–2 constans. Spiculae ternatae, late ellipticae, 1.8–1.9 mm longae, 0.9–1.1 mm latae; gluma prima minuta, truncata; gluma secunda truncata, 1.5–1.7 mm longa; lemmate infero spiculam aequanti; gluma secunda et lemmate infero pilis minutis clavatis obsitis; lemmate supero badio.

Caespitose, perennial herb. Culms 30–90 cm long; internodes glabrous; nodes papillose-hirsute, especially the lower ones. Leaves with the sheaths papillose-hirsute; ligules ca. 0.5 mm long, membranous; blades 6–24 cm long, 2–3 mm wide, glabrous except for a few elongated trichomes near the adaxial base. Inflorescence 2–7 cm long, of 1–2 racemes 2–4 cm long. Spikelets 1.8–1.9 mm long, 0.9–1.1 mm wide, broadly elliptic, in triads; lower glume a minute, nerveless, hyaline cuff 0.05–0.15 mm long; upper glume 1.5–1.7 mm long, broad, blunt, 3-nerved; lower lemma as long as the spikelet, 5–7-nerved; upper glume and lower lemma beset with clavate hairs ca. 0.3 mm long and dilated nearly to their bases; upper lemma dark brown; stamens 3, the anthers ca. 0.9 mm long; styles purple.

Paratype. PANAMA. CANAL ZONE: between Panama and Corozal, prairie, 20–50 m, 17 Dec. 1911, *Hitchcock* 9196 (US).

This species is only known from grasslands in central Panama at low elevations. It belongs to Henrard's (1950) section *Corynotrichae*, which is characterized by minute balloon-shaped hairs. The epithet of the new species refers to this type of hair. All previously known species of this section are from South America. It differs from its closest ally, *D. venezuelae* Henrard, in the presence of a lower glume and in the shorter upper glume. Swallen (1943: 170) identified the two cited specimens as *D. singularis* Mez, a species described from Paraguay and also known from Argentina (Rúgolo de Agrasar, 1974). However, *D. clavitricha* differs from *D. singularis*, in its much smaller spikelets and non-protruding fertile floret.

ANDROPOGONEAE

Andropogon gerardii Vitman var. ***hondurensis*** R. Pohl, var. nov. TYPE: Honduras. Road to Teupasenti, open pine forest, 1,350 m, 22 June 1980, *R. W. Pohl & L. G. Clark* 14011 (holotype, ISC).

A var. *gerardii* culmis gracilibus brevibusque, spiculis sessilibus brevioribus ca. 5–5.3 mm longis, gluma inferiore plana esulcata recedit.

Caespitose, perennial herb with short, thick rhizomes. Culms 70–200 cm long. Leaves mostly basal, glabrous except for a tuft of hairs in the ligular area; ligule 1.0–2.5 mm, a ciliolate membrane; blades to 50 cm long, 3.0–5.5 mm wide, folded or flat, the tip acute. Inflorescences several, scarcely overlapping; spathes narrow; racemes 1–3 per peduncle, 3–8 cm long, ascending, sparsely pubescent with hairs 2.0–3.5(–4.0) mm long; rachis internodes clavate, flat. Sessile spikelets 5.0–5.3 mm long; callus oblique, pilose with hairs 0.5–2.5 mm long; glumes awnless, the lower flat, several-nerved between the keels, coriaceous; awn of the upper lemma exerted to 11 mm, twisted in the lower ½, geniculate; stamens 3, the anthers 1.0–1.2 mm long; pedicellate spikelets 5–7 mm long, acute, the flower absent or staminate; stamens 3 when present, the anthers to 2.4 mm long. $2n = 80$.

Representative paratypes. BELIZE. EL CAYO: Mountain Pine Ridge, July–Aug. 1936, *Lundell* 6791 (F). HONDURAS. COMAYAGUA: vic. of Siguatepeque, 4 July 1936, *Yuncker et al.* 5641 (MO); 10 km E of Siguatepeque, 17 June 1980, *Pohl & Clark* 13988 (ISC). DISTRITO CENTRAL: El Hatillo, *Pohl & Gabel* 13794 (ISC). EL PARAÍSO: Güinope, 25 Oct. 1951, *Swallen* 11105 (ISC); 22 km W of Danlí, 21 July 1970, *Pohl & Davidse* 12400 (MO). FRANCISCO MORAZÁN: 4 km N of La Venta, 20 June 1970, *Pohl & Davidse* 12031 (ISC); Las Mesas, 15 Oct. 1951, *Swallen* 10762 (ISC). INTIBUCA: La Esperanza, 12 Sep. 1981, *Segovia* 101 (MO); 8 km SW de Masaguara, 6 June 1985, *Téllez V. & Martínez S.* 8675 (MO). COSTA RICA. GUANACASTE: SE slopes of Volcán Santa María, 27–28 Jan. 1983, *Davidse et al.* 23331 (MO).

Plants of variety *hondurensis* are especially common, but scattered, in the open pine forests of central Honduras, and this is the basis for the epithet. They have been collected at elevations of 800–2,000 m.

Andropogon gerardii var. *hondurensis* in Mesoamerica is smaller and more gracile than the typical variety encountered in the United States. The Mesoamerican plants also differ from the North American plants in having shorter sessile spikelets, averaging ca. 5 mm long, whereas plants in the temperate United States usually have spikelets 7–10 mm long. Lower glumes of the sessile spikelets of the Mesoamerican plants are flat, while those from the United States are sulcate. Although various ploidy levels for this species are known, the Honduran plants, so far as known, are octoploid, $2n = 80$, (*Davidse & Pohl*, 1972, as *A. gerardii*).

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